Description of Device Parameters
Proline Promag 400
Modbus RS485
Electromagnetic flowmeter
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1 About this document

1.1 Document function
The document is part of the Operating Instructions and serves as a reference for parameters, providing a detailed explanation of each individual parameter of the Expert operating menu.

It is used to perform tasks that require detailed knowledge of the function of the device:
- Commissioning measurements under difficult conditions
- Optimal adaptation of the measurement to difficult conditions
- Detailed configuration of the communication interface
- Error diagnostics in difficult cases

1.2 Target group
The document is aimed at specialists who work with the device over the entire life cycle and perform specific configurations.

1.3 Using this document

1.3.1 Information on the document structure
The document lists the submenus and their parameters according to the structure from the Expert menu (→ 8), which is displayed when the "Maintenance" user role is enabled.
Additional information regarding:
- The arrangement of the parameters according to the menu structure of the Operation menu, Setup menu, Diagnostics menu with a brief description: Operating Instructions → 7
- Operating concept of the operating menus: Operating Instructions → 7
1.3.2  Structure of a parameter description

The individual parts of a parameter description are described in the following section:

<table>
<thead>
<tr>
<th>Complete parameter name</th>
<th>Write-protected parameter</th>
</tr>
</thead>
</table>

**Navigation**
- Navigation path to the parameter via the local display (direct access code) or web browser
- Navigation path to the parameter via the operating tool
- The names of the menus, submenus and parameters are abbreviated to the form in which they appear on the display and in the operating tool.

**Prerequisite**
- The parameter is only available under these specific conditions

**Description**
- Description of the parameter function

**Selection**
- List of the individual options for the parameter
  - Option 1
  - Option 2

**User entry**
- Input range for the parameter

**User interface**
- Display value/data for the parameter

**Factory setting**
- Default setting ex works

**Additional information**
- Additional explanations (e.g. in examples):
  - On individual options
  - On display values/data
  - On the input range
  - On the factory setting
  - On the parameter function

1.4  Symbols used

1.4.1  Symbols for certain types of information

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="#" alt="Tip" /></td>
<td>Indicates additional information.</td>
</tr>
<tr>
<td><img src="#" alt="Reference to documentation" /></td>
<td>Reference to documentation</td>
</tr>
<tr>
<td><img src="#" alt="Reference to page" /></td>
<td>Reference to page</td>
</tr>
<tr>
<td><img src="#" alt="Reference to graphic" /></td>
<td>Reference to graphic</td>
</tr>
<tr>
<td><img src="#" alt="Operation via local display" /></td>
<td>Operation via local display</td>
</tr>
<tr>
<td><img src="#" alt="Operation via operating tool" /></td>
<td>Operation via operating tool</td>
</tr>
<tr>
<td><img src="#" alt="Write-protected parameter" /></td>
<td>Write-protected parameter</td>
</tr>
</tbody>
</table>
1.4.2 Symbols in graphics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3 ...</td>
<td>Item numbers</td>
<td>A, B, C ...</td>
<td>Views</td>
</tr>
<tr>
<td>A-A, B-B, C-C, ...</td>
<td>Sections</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.5 Documentation

1.5.1 Standard documentation

Operating Instructions

<table>
<thead>
<tr>
<th>Measuring device</th>
<th>Documentation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promag D 400</td>
<td>BA01229D</td>
</tr>
<tr>
<td>Promag L 400</td>
<td>BA01230D</td>
</tr>
<tr>
<td>Promag W 400</td>
<td>BA01231D</td>
</tr>
</tbody>
</table>

1.5.2 Supplementary device-dependent documentation

Special Documentation

<table>
<thead>
<tr>
<th>Content</th>
<th>Documentation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heartbeat Verification + Monitoring application package</td>
<td>SD02568D</td>
</tr>
<tr>
<td>Display modules A309/A310</td>
<td>SD01793D</td>
</tr>
<tr>
<td>Information on Custody Transfer Measurement</td>
<td>SD02561D</td>
</tr>
</tbody>
</table>
## Overview of the Expert operating menu

The following table provides an overview of the menu structure of the expert operating menu and its parameters. The page reference indicates where the associated description of the submenu or parameter can be found.

<table>
<thead>
<tr>
<th>Expert</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct access (0106)</td>
<td>10</td>
</tr>
<tr>
<td>Locking status (0004)</td>
<td>11</td>
</tr>
<tr>
<td>User role (0005)</td>
<td>12</td>
</tr>
<tr>
<td>Enter access code (0003)</td>
<td>13</td>
</tr>
<tr>
<td><strong>System</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>13</td>
</tr>
<tr>
<td><strong>Diagnostic handling</strong></td>
<td>26</td>
</tr>
<tr>
<td><strong>Administration</strong></td>
<td>34</td>
</tr>
<tr>
<td><strong>Sensor</strong></td>
<td>40</td>
</tr>
<tr>
<td><strong>Measured values</strong></td>
<td>40</td>
</tr>
<tr>
<td><strong>System units</strong></td>
<td>47</td>
</tr>
<tr>
<td><strong>Process parameters</strong></td>
<td>55</td>
</tr>
<tr>
<td><strong>External compensation</strong></td>
<td>71</td>
</tr>
<tr>
<td><strong>Sensor adjustment</strong></td>
<td>73</td>
</tr>
<tr>
<td><strong>Calibration</strong></td>
<td>80</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td>81</td>
</tr>
<tr>
<td><strong>Current output 1</strong></td>
<td>82</td>
</tr>
<tr>
<td><strong>Pulse/frequency/switch output 1 to n</strong></td>
<td>94</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>112</td>
</tr>
<tr>
<td><strong>Modbus configuration</strong></td>
<td>113</td>
</tr>
<tr>
<td><strong>Modbus information</strong></td>
<td>117</td>
</tr>
</tbody>
</table>
Overview of the Expert operating menu

- Modbus data map → 118
- Web server → 119
- WLAN settings → 122

- Application → 129
  - Reset all totalizers (2806) → 129
  - Totalizer 1 to n → 129
  - Custody transfer → 134

- Diagnostics → 134
  - Actual diagnostics (0691) → 135
  - Previous diagnostics (0690) → 135
  - Operating time from restart (0653) → 136
  - Operating time (0652) → 136
  - Diagnostic list → 137
  - Event logbook → 141
  - Custody transfer logbook → 143
  - Device information → 143
  - Main electronic module → 147
  - Sensor electronic module (ISEM) → 148
  - Display module → 149
  - Data logging → 150
  - Min/max values → 158
  - Heartbeat Technology → 160
  - Simulation → 160
3 Description of Device Parameters

In the following section, the parameters are listed according to the menu structure of the local display. Specific parameters for the operating tools are included at the appropriate points in the menu structure.

**Navigation**  
Expert → Direct access (0106)

**Description**  
Use this function to enter the access code to enable direct access to the desired parameter via the local display. A parameter number is assigned to each parameter for this purpose.

**User entry**  
0 to 65 535

**Additional information**  
*User entry*

The direct access code consists of a 5-digit number (at maximum) and the channel number, which identifies the channel of a process variable: e.g. 00914-2. In the navigation view, this appears on the right-hand side in the header of the selected parameter.
1 Direct access code

Note the following when entering the direct access code:

- The leading zeros in the direct access code do not have to be entered.
  Example: Enter “914” instead of “00914”
- If no channel number is entered, channel 1 is opened automatically.
  Example: Enter 00914 → Assign process variable parameter
- If a different channel is opened: Enter the direct access code with the corresponding channel number.
  Example: Enter 00914-2 → Assign process variable parameter

Locking status

Navigation

Expert → Locking status (0004)

Description

Displays the active write protection.

User interface

- Hardware locked
- CT active - defined parameters
- CT active - all parameters
- Temporarily locked

Additional information

User interface

If two or more types of write protection are active, the write protection with the highest priority is shown on the local display. In the operating tool all active types of write protection are displayed.

Detailed information on access authorization is provided in the "User roles and associated access authorization" and "Operating concept" sections of the Operations Instructions for the device → 7

Selection

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>The access status displayed in the Access status display parameter (→ 12) applies. Only appears on local display.</td>
</tr>
<tr>
<td>Hardware locked (priority 1)</td>
<td>The DIP switch for hardware locking is activated on the main electronics module. This locks write access to the parameters (e.g. via local display or operating tool).</td>
</tr>
<tr>
<td>Temporarily locked (priority 2)</td>
<td>Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset etc.). Once the internal processing has been completed, the parameters can be changed once again.</td>
</tr>
</tbody>
</table>
Access status display

Navigation

Expert → Access stat.disp (0091)

Prerequisite

A local display is provided.

Description

Displays the access authorization to the parameters via the local display.

User interface

- Operator
- Maintenance

Factory setting

Operator

Additional information

If the 📈-symbol appears in front of a parameter, it cannot be modified via the local display with the current access authorization.

Access authorization can be modified via the **Enter access code** parameter (→ 📈 13).

For information about the **Enter access code** parameter: see the "Disabling write protection via the access code" section of the Operating Instructions for the device → 📈 7

If additional write protection is active, this restricts the current access authorization even further.

User interface

Detailed information on access authorization is provided in the "User roles and associated access authorization" and "Operating concept" sections of the Operations Instructions for the device → 📈 7

User role

Navigation

Expert → User role (0005)

Description

Displays the access authorization to the parameters via the operating tool or Web browser.

User interface

- Operator
- Maintenance

Factory setting

Maintenance
Additional information

**Description**

Access authorization can be modified via the **Enter access code** parameter (→ 13).

If additional write protection is active, this restricts the current access authorization even further.

**User interface**

Detailed information on access authorization is provided in the "User roles and associated access authorization" and "Operating concept" sections of the Operations Instructions for the device → 7

---

### Enter access code

**Navigation**

Expert → Ent. access code (0003)

**Description**

Use this function to enter the user-specific release code to remove parameter write protection.

**User entry**

Max. 16-digit character string comprising numbers, letters and special characters

---

### 3.1 "System" submenu

**Navigation**

Expert → System

---

#### 3.1.1 "Display" submenu

**Navigation**

Expert → System → Display

---

- Display language (0106) → 14
- Format display (0098) → 15
- Value 1 display (0107) → 17
## Display language

### Navigation

- Expert → System → Display → Display language (0104)

### Prerequisite

A local display is provided.

### Description

Use this function to select the configured language on the local display.

### Selection

- English
- Deutsch
- Français

---

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0% bargraph value 1 (0123)</td>
<td>→ 17</td>
</tr>
<tr>
<td>100% bargraph value 1 (0125)</td>
<td>→ 18</td>
</tr>
<tr>
<td>Decimal places 1 (0095)</td>
<td>→ 18</td>
</tr>
<tr>
<td>Value 2 display (0108)</td>
<td>→ 19</td>
</tr>
<tr>
<td>Decimal places 2 (0117)</td>
<td>→ 19</td>
</tr>
<tr>
<td>Value 3 display (0110)</td>
<td>→ 20</td>
</tr>
<tr>
<td>Decimal places 3 (0118)</td>
<td>→ 21</td>
</tr>
<tr>
<td>Value 4 display (0109)</td>
<td>→ 21</td>
</tr>
<tr>
<td>Decimal places 4 (0119)</td>
<td>→ 22</td>
</tr>
<tr>
<td>Display interval (0096)</td>
<td>→ 22</td>
</tr>
<tr>
<td>Display damping (0094)</td>
<td>→ 23</td>
</tr>
<tr>
<td>Header (0097)</td>
<td>→ 23</td>
</tr>
<tr>
<td>Header text (0112)</td>
<td>→ 24</td>
</tr>
<tr>
<td>Separator (0101)</td>
<td>→ 25</td>
</tr>
<tr>
<td>Contrast display (0105)</td>
<td>→ 25</td>
</tr>
<tr>
<td>Backlight (0111)</td>
<td>→ 25</td>
</tr>
</tbody>
</table>
Factory setting: English (alternatively, the ordered language is preset in the device)

Format display

Navigation
Expert → System → Display → Format display (0098)

Prerequisite
A local display is provided.

Description
Use this function to select how the measured value is shown on the local display.

Selection
- 1 value, max. size
- 1 bargraph + 1 value
- 2 values
- 1 value large + 2 values
- 4 values

Factory setting
1 value, max. size

Additional information
Description
The display format (size, bar graph etc.) and number of measured values displayed simultaneously (1 to 4) can be configured. This setting only applies to normal operation.

- The Value 1 display parameter (→ 17) to Value 4 display parameter (→ 21) are used to specify which measured values are shown on the local display and in what order.
- If more measured values are specified than the display mode selected permits, then the values alternate on the device display. The display time until the next change is configured via the Display interval parameter (→ 22).

Visibility depends on order options or device settings
Possible measured values shown on the local display:

"1 value, max. size" option

```
+--------------------+
| XXXXXXXXXX         |
|                   |
|                   |
|                   |
|                   |
|                   |
|                   |
|                   |
|                   |
|                   |
|                   |
|                   |
|                   |
| +-----------------+|
|                 |
|                 |
|                 |
|                 |
| 900.00          |
|                 |
|                 |
|                 |
|                 |
|  l/h             |
```

"1 bargraph + 1 value" option

```
+--------------------+
| XXXXXXXXXX         |
|                   |
|                   |
|                   |
|                   |
| +-----------------+|
|                 |
|                 |
|                 |
|                 |
| 900.00           |
|                 |
|                 |
|                 |
|  kg/l            |
|                 |
|                 |
|                 |
|  l/h             |
```

"2 values" option

```
+--------------------+
| XXXXXXXXXX         |
|                   |
|                   |
|                   |
|                   |
|                   |
|                   |
| m                 |
| 900.00            |
| kg/h              |
|                   |
|                 |
|                 |
| 900.00           |
| l/h              |
```

"1 value large + 2 values" option

```
+--------------------+
| XXXXXXXXXX         |
|                   |
|                   |
|                   |
|                   |
|                   |
|                   |
| +-----------------+|
|                 |
|                 |
|                 |
| m               |
| 900.00           |
| kg/h             |
|                 |
|                 |
| 900.00           |
| l/h              |
|                 |
|                 |
| 1.00             |
| kg/l             |
```

"4 values" option

```
+--------------------+
| XXXXXXXXXX         |
|                   |
|                   |
|                   |
|                   |
|                   |
|                   |
| +-----------------+|
|                 |
|                 |
|                 |
|                 |
| m               |
| 900.00           |
| kg/h             |
|                 |
|                 |
| 900.00           |
| l/h              |
|                 |
|                 |
|                 |
|                 |
| 1.00             |
| kg/l             |
|                 |
|                 |
| 213.94           |
| kg               |
```
**Value 1 display**

**Navigation**

Expert → System → Display → Value 1 display (0107)

**Prerequisite**

A local display is provided.

**Description**

Use this function to select one of the measured values shown on the local display.

**Selection**

- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Conductivity *
- Corrected conductivity *
- Electronics temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Current output 1
- Noise *
- Coil current shot time *
- Reference electrode potential against PE *
- Build-up index *
- Test point 1
- Test point 2
- Test point 3

**Factory setting**

Volume flow

**Additional information**

*Description*

If several measured values are displayed at once, the measured value selected here will be the first value to be displayed. The value is only displayed during normal operation.

* Dependency*

The **Format display** parameter (→ 15) is used to specify how many measured values are displayed simultaneously and how.

**0% bargraph value 1**

**Navigation**

Expert → System → Display → 0% bargraph 1 (0123)

**Prerequisite**

A local display is provided.

**Description**

Use this function to enter the 0% bar graph value to be shown on the display for the measured value 1.

**User entry**

Signed floating-point number

* Visibility depends on order options or device settings
### Description of Device Parameters

#### Proline Promag 400 Modbus RS485

#### Factory setting

Country-specific:
- 0 l/h
- 0 gal/min (us)

#### Additional information

**Description**

The **Format display** parameter (→ 15) is used to specify that the measured value is to be displayed as a bar graph.

**User entry**

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

<table>
<thead>
<tr>
<th>100% bargraph value 1</th>
</tr>
</thead>
</table>

#### Navigation

Expert → System → Display → 100% bargraph 1 (0125)

#### Prerequisite

A local display is provided.

#### Description

Use this function to enter the 100% bar graph value to be shown on the display for the measured value 1.

#### User entry

Signed floating-point number

#### Factory setting

Depends on country and nominal diameter → 167

#### Additional information

**Description**

The **Format display** parameter (→ 15) is used to specify that the measured value is to be displayed as a bar graph.

**User entry**

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

### Decimal places 1

#### Navigation

Expert → System → Display → Decimal places 1 (0095)

#### Prerequisite

A measured value is defined in the **Value 1 display** parameter (→ 17).

#### Description

Use this function to select the number of decimal places for measured value 1.

#### Selection

- x
- x.x
- x.xx
- x.xxx
- x.xxxx

#### Factory setting

x.xx
**Value 2 display**

**Navigation**
Expert → System → Display → Value 2 display (0108)

**Prerequisite**
A local display is provided.

**Description**
Use this function to select one of the measured values shown on the local display.

**Selection**
For the picklist, see the Value 1 display parameter (→ 17)

**Factory setting**
None

**Additional information**
If several measured values are displayed at once, the measured value selected here will be the second value to be displayed. The value is only displayed during normal operation.

The Format display parameter (→ 15) is used to specify how many measured values are displayed simultaneously and how.

**Dependency**

The unit of the displayed measured value is taken from the System units submenu (→ 47).

**Decimal places 2**

**Navigation**
Expert → System → Display → Decimal places 2 (0117)

**Prerequisite**
A measured value is specified in the Value 2 display parameter (→ 19).

**Description**
Use this function to select the number of decimal places for measured value 2.

**Selection**
- x
- x.x
- x.xx
- x.xxx
- x.xxxx

**Factory setting**
X.xx

**Additional information**
This setting does not affect the measuring or computational accuracy of the device. The arrow displayed between the measured value and the unit indicates that the device computes with more digits than are shown on the local display.
### Value 3 display

#### Navigation
Expert → System → Display → Value 3 display (0110)

#### Prerequisite
A local display is provided.

#### Description
Use this function to select one of the measured values shown on the local display.

#### Selection
For the picklist, see the Value 1 display parameter (→ 17)

#### Factory setting
None

#### Additional information

**Description**
If several measured values are displayed at once, the measured value selected here will be the third value to be displayed. The value is only displayed during normal operation.

The Format display parameter (→ 15) is used to specify how many measured values are displayed simultaneously and how.

**Selection**

The unit of the displayed measured value is taken from the System units submenu (→ 47).

### 0% bargraph value 3

#### Navigation
Expert → System → Display → 0% bargraph 3 (0124)

#### Prerequisite
A selection was made in the Value 3 display parameter (→ 20).

#### Description
Use this function to enter the 0% bar graph value to be shown on the display for the measured value 3.

#### User entry
Signed floating-point number

#### Factory setting
Country-specific:
- 0 l/h
- 0 gal/min (us)

#### Additional information

**Description**
The Format display parameter (→ 15) is used to specify that the measured value is to be displayed as a bar graph.

**User entry**
The unit of the displayed measured value is taken from the System units submenu (→ 47).
### 100% bargraph value 3

**Navigation**  
Expert → System → Display → 100% bargraph 3 (0126)

**Prerequisite**  
A selection was made in the **Value 3 display** parameter (→ 20).

**Description**  
Use this function to enter the 100% bar graph value to be shown on the display for the measured value 3.

**User entry**  
Signed floating-point number

**Factory setting**  
0

**Additional information**  
*Description*

- The **Format display** parameter (→ 15) is used to specify that the measured value is to be displayed as a bar graph.

*User entry*

- The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

### Decimal places 3

**Navigation**  
Expert → System → Display → Decimal places 3 (0118)

**Prerequisite**  
A measured value is specified in the **Value 3 display** parameter (→ 20).

**Description**  
Use this function to select the number of decimal places for measured value 3.

**Selection**  
- x
- x.x
- x.xx
- x.xxx
- x.xxxx

**Factory setting**  
x.xx

**Additional information**  
*Description*

- This setting does not affect the measuring or computational accuracy of the device. The arrow displayed between the measured value and the unit indicates that the device computes with more digits than are shown on the local display.

### Value 4 display

**Navigation**  
Expert → System → Display → Value 4 display (0109)

**Prerequisite**  
A local display is provided.
Description

Use this function to select one of the measured values shown on the local display.

Selection

For the picklist, see the **Value 1 display** parameter (→ 17)

Factory setting

None

Additional information

**Description**

If several measured values are displayed at once, the measured value selected here will be the fourth value to be displayed. The value is only displayed during normal operation.

The **Format display** parameter (→ 15) is used to specify how many measured values are displayed simultaneously and how.

**Selection**

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

---

**Decimal places 4**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Display → Decimal places 4 (0119)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>A measured value is specified in the <strong>Value 4 display</strong> parameter (→ 21).</td>
</tr>
</tbody>
</table>

**Description**

Use this function to select the number of decimal places for measured value 4.

**Selection**

- x
- x.x
- x.xx
- x.xxx
- x.xxxx

**Factory setting**

x.xx

**Additional information**

**Description**

This setting does not affect the measuring or computational accuracy of the device. The arrow displayed between the measured value and the unit indicates that the device computes with more digits than are shown on the local display.

---

**Display interval**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Display → Display interval (0096)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>A local display is provided.</td>
</tr>
</tbody>
</table>

**Description**

Use this function to enter the length of time the measured values are displayed if the values alternate on the display.

**User entry**

1 to 10 s
Display damping

- **Navigation**
  - Expert → System → Display → Display damping (0094)

- **Prerequisite**
  - A local display is provided.

- **Description**
  - Use this function to enter a time constant for the reaction time of the local display to fluctuations in the measured value caused by process conditions.

- **User entry**
  - 0.0 to 999.9 s

- **Factory setting**
  - 0.0 s

- **Additional information**
  - Use this function to enter a time constant (PT1 element \(^1\)) for display damping:
    - If a low time constant is entered, the display reacts particularly quickly to fluctuating measured variables.
    - On the other hand, the display reacts more slowly if a high time constant is entered.
    - Damping is switched off if 0 is entered (factory setting).

Header

- **Navigation**
  - Expert → System → Display → Header (0097)

- **Prerequisite**
  - A local display is provided.

- **Description**
  - Use this function to select the contents of the header of the local display.

- **Selection**
  - Device tag
  - Free text

- **Factory setting**
  - Device tag

---

\(^1\) proportional transmission behavior with first order delay
Description of Device Parameters

Additional information

**Description**
The header text only appears during normal operation.

---

1  *Position of the header text on the display*

**Selection**

- Device tag
  - Is defined in the **Device tag** parameter (→ 14).
- Free text
  - Is defined in the **Header text** parameter (→ 24).

---

**Header text**

---

**Navigation**

Expert → System → Display → Header text (0112)

**Prerequisite**

In the **Header** parameter (→ 23), the **Free text** option is selected.

**Description**

Use this function to enter a customer-specific text for the header of the local display.

**User entry**

Max. 12 characters such as letters, numbers or special characters (e.g. @, %, /)

**Factory setting**

----------

**Additional information**

**Description**
The header text only appears during normal operation.

---

1  *Position of the header text on the display*

**User entry**

The number of characters displayed depends on the characters used.
<table>
<thead>
<tr>
<th><strong>Separator</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
<td></td>
</tr>
</tbody>
</table>

[Expert → System → Display → Separator (0101)]  |
| **Prerequisite** | A local display is provided. |
| **Description** | Use this function to select the decimal separator. |
| **Selection** | • . (point)  
• , (comma) |
| **Factory setting** | . (point) |

<table>
<thead>
<tr>
<th><strong>Contrast display</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
<td></td>
</tr>
</tbody>
</table>

[Expert → System → Display → Contrast display (0105)]  |
| **Prerequisite** | A local display is provided. |
| **Description** | Use this function to enter a value to adapt the display contrast to the ambient conditions (e.g. the lighting or viewing angle). |
| **User entry** | 20 to 80 % |
| **Factory setting** | 50 % |

<table>
<thead>
<tr>
<th><strong>Backlight</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
<td></td>
</tr>
</tbody>
</table>

[Expert → System → Display → Backlight (0111)]  |
| **Prerequisite** | A local display is provided. |
| **Description** | Use this function to switch the backlight of the local display on and off. |
| **Selection** | • Disable  
• Enable |
| **Factory setting** | Enable |

<table>
<thead>
<tr>
<th><strong>Access status display</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
<td></td>
</tr>
</tbody>
</table>

[Expert → System → Display → Access stat.disp (0091)]  |
| **Prerequisite** | A local display is provided. |
### Description
Displays the access authorization to the parameters via the local display.

### User interface
- Operator
- Maintenance

### Factory setting
Operator

### Additional information
#### Description
If the 🚃-symbol appears in front of a parameter, it cannot be modified via the local display with the current access authorization.

Access authorization can be modified via the **Enter access code** parameter (→ 13).

For information about the **Enter access code** parameter: see the "Disabling write protection via the access code" section of the Operating Instructions for the device → 7.

If additional write protection is active, this restricts the current access authorization even further.

#### User interface
Detailed information on access authorization is provided in the "User roles and associated access authorization" and "Operating concept" sections of the Operations Instructions for the device → 7.

### 3.1.2 "Diagnostic handling" submenu

#### Navigation
Expert → System → Diagn. handling

#### Alarm delay (0651)

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Diagn. handling → Alarm delay (0651)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Description</strong></th>
<th>Use this function to enter the time interval until the device generates a diagnostic message.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User entry</strong></td>
<td>0 to 60 s</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>0 s</td>
</tr>
</tbody>
</table>
Additional information

Result

This setting affects the following diagnostic messages:
- 190 Special event 1
- 832 Electronics temperature too high
- 833 Electronics temperature too low
- 862 Pipe empty
- 990 Special event 4

"Diagnostic behavior" submenu

Each item of diagnostic information is assigned a specific diagnostic behavior at the factory. The user can change this assignment for specific diagnostic information in the Diagnostic behavior submenu (→ 27).

The following options are available in the Assign behavior of diagnostic no. xxx parameters:

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>The device stops measurement. The measured value output via Modbus RS485 and the totalizers assume the defined alarm condition. A diagnostic message is generated. The background lighting changes to red.</td>
</tr>
<tr>
<td>Warning</td>
<td>The device continues to measure. The measured value output via Modbus RS485 and the totalizers are not affected. A diagnostic message is generated.</td>
</tr>
<tr>
<td>Logbook entry only</td>
<td>The device continues to measure. The diagnostic message is displayed only in the Event logbook submenu (→ 141) (Event list submenu (→ 142)) and is not displayed in alternation with the operational display.</td>
</tr>
<tr>
<td>Off</td>
<td>The diagnostic event is ignored, and no diagnostic message is generated or entered.</td>
</tr>
</tbody>
</table>

For a list of all the diagnostic events, see the Operating Instructions for the device → 7

Navigation       Expert → System → Diagn. handling → Diagn. behavior
Assignment of diagnostic behavior

Assign behavior of diagnostic no. 832 (0681) \(\rightarrow 31\)
Assign behavior of diagnostic no. 833 (0682) \(\rightarrow 31\)
Assign behavior of diagnostic no. 834 (0700) \(\rightarrow 32\)
Assign behavior of diagnostic no. 835 (0702) \(\rightarrow 32\)
Assign behavior of diagnostic no. 842 (0638) \(\rightarrow 33\)
Assign behavior of diagnostic no. 962 (0745) \(\rightarrow 33\)
Assign behavior of diagnostic no. 937 (0743) \(\rightarrow 33\)
Assign behavior of diagnostic no. 938 (0642) \(\rightarrow 34\)
Assign behavior of diagnostic no. 961 (0736) \(\rightarrow 34\)

**Assign behavior of diagnostic no. 043 (Sensor short circuit)**

**Navigation**

Expert \rightarrow System \rightarrow Diagn. handling \rightarrow Diagn. behavior \rightarrow Diagnostic no. 043 (0650)

**Description**

Use this function to change the diagnostic behavior of the 043 Sensor short circuit diagnostic message.

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection:
## Assign behavior of diagnostic no. 302 (Device verification active)

**Navigation**

> Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 302 (0739)

**Description**

Use this function to change the diagnostic behavior of the **302 Device verification active** diagnostic message.

**Selection**

- Alarm
- Warning

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection:

---

## Assign behavior of diagnostic no. 376 (Sensor electronics (ISEM) faulty)

**Navigation**

> Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 376 (0645)

**Description**

Use this function to change the diagnostic behavior of the **376 Sensor electronics (ISEM) faulty** diagnostic message.

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection:

---

## Assign behavior of diagnostic no. 377 (Sensor electronics (ISEM) faulty)

**Navigation**

> Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 377 (0777)

**Description**

Use this function to change the diagnostic behavior of the **377 Sensor electronics (ISEM) faulty** diagnostic message.

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection:
Assign behavior of diagnostic no. 441 (Current output 1)

**Navigation**
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 441 (0657)

**Description**
Use this function to change the diagnostic behavior of the **441 Current output 1** diagnostic message.

**Selection**
- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**
Warning

**Additional information**
Detailed description of the options available for selection:

Assign behavior of diagnostic no. 442 (Frequency output 1 to n)

**Navigation**
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 442 (0658)

**Prerequisite**
The measuring device has a pulse/frequency/switch output.

**Description**
Use this function to change the diagnostic behavior of the **442 Frequency output 1 to n** diagnostic message.

**Selection**
- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**
Warning

**Additional information**
Detailed description of the options available for selection:

Assign behavior of diagnostic no. 443 (Pulse output 1 to n)

**Navigation**
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 443 (0659)

**Prerequisite**
The measuring device has a pulse/frequency/switch output.

**Description**
Use this function to change the diagnostic behavior of the **443 Pulse output 1 to n** diagnostic message.

**Selection**
- Off
- Alarm
- Warning
- Logbook entry only
Factory setting: Warning

Additional information: Detailed description of the options available for selection:

Assign behavior of diagnostic no. 531 (Empty pipe detection)

Navigation: Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 531 (0741)

Description: Use this function to change the diagnostic behavior of the 531 Empty pipe detection diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting: Warning

Additional information: Detailed description of the options available for selection:

Assign behavior of diagnostic no. 832 (Electronics temperature too high)

Navigation: Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 832 (0681)

Description: Use this function to change the diagnostic behavior of the 832 Electronics temperature too high diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting: Logbook entry only

Additional information: Detailed description of the options available for selection:

Assign behavior of diagnostic no. 833 (Electronics temperature too low)

Navigation: Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 833 (0682)

Description: Use this function to change the diagnostic behavior of the 833 Electronics temperature too low diagnostic message.
Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Logbook entry only

Additional information
Detailed description of the options available for selection:

Assign behavior of diagnostic no. 834 (Process temperature too high)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 834 (0700)

Description
Use this function to change the diagnostic behavior of the 834 Process temperature too high diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
Detailed description of the options available for selection:

Assign behavior of diagnostic no. 835 (Process temperature too low)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 835 (0702)

Description
Use this function to change the diagnostic behavior of the 835 Process temperature too low diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
Detailed description of the options available for selection:
<table>
<thead>
<tr>
<th>Assign behavior of diagnostic no. 842</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
<td></td>
</tr>
<tr>
<td>Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 842 (0638)</td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Change behavior of diagnostic event with diagnostic number 842 'Process limit'.</td>
</tr>
</tbody>
</table>
| **Selection**                        | • Off  
• Alarm  
• Warning  
• Logbook entry only |
| **Factory setting**                  | Off |

<table>
<thead>
<tr>
<th>Assign behavior of diagnostic no. 962 (Pipe empty)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
<td></td>
</tr>
<tr>
<td>Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 962 (0745)</td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to change the diagnostic behavior of the <strong>862 Pipe empty</strong> diagnostic message.</td>
</tr>
</tbody>
</table>
| **Selection**                                     | • Off  
• Alarm  
• Warning  
• Logbook entry only |
| **Factory setting**                               | Warning |

**Additional information**

Detailed description of the options available for selection:

<table>
<thead>
<tr>
<th>Assign behavior of diagnostic no. 937 (EMC interference)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
<td></td>
</tr>
<tr>
<td>Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 937 (0743)</td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to change the diagnostic behavior of the <strong>937 EMC interference</strong> diagnostic message.</td>
</tr>
</tbody>
</table>
| **Selection**                                            | • Off  
• Alarm  
• Warning  
• Logbook entry only |
| **Factory setting**                                      | Warning |

**Additional information**

Detailed description of the options available for selection:
Assign behavior of diagnostic no. 938 (EMC interference)

**Navigation**

[Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 938 (0642)]

**Description**

Use this function to change the diagnostic behavior of the **938 EMC interference** diagnostic message.

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Alarm

**Additional information**

Detailed description of the options available for selection:

Assign behavior of diagnostic no. 961

**Navigation**

[Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 961 (0736)]

**Description**

Select diagnostic behavior for the selected diagnostic number.

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Alarm

---

3.1.3 "Administration" submenu

**Navigation**

[Expert → System → Administration]

- Define access code
- Reset access code
- Device reset (0000)
- Activate SW option (0029)
- Software option overview (0015)
"Define access code" wizard

The Define access code wizard (→ 35) is only available when operating via the local display or Web browser.

If operating via the operating tool, the Define access code parameter (→ 37) can be found directly in the Administration submenu. There is no Confirm access code parameter if the device is operated via the operating tool.

Navigation Expert → System → Administration → Def. access code

<table>
<thead>
<tr>
<th>Define access code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define access code</td>
</tr>
<tr>
<td>Confirm access code</td>
</tr>
</tbody>
</table>

Define access code

Navigation Expert → System → Administration → Def. access code → Def. access code

Description
Use this function to enter a user-specific release code to restrict write-access to the parameters. This protects the configuration of the device against any inadvertent changes via the local display or Web browser.

User entry 0 to 9 999

Factory setting 0

Additional information Description
The write protection affects all parameters in the document marked with the symbol. On the local display, the symbol in front of a parameter indicates that the parameter is write-protected.

The parameters that cannot be write-accessed are grayed out in the Web browser.

Once the access code has been defined, write-protected parameters can only be modified if the access code is entered in the Enter access code parameter (→ 13).

If you lose the access code, please contact your Endress+Hauser sales organization.

User entry
A message is displayed if the access code is not in the input range.

Factory setting
If the factory setting is not changed or 0 is defined as the access code, the parameters are not write-protected and the device configuration data can be modified. The user is logged on in the "Maintenance" role.
**Confirm access code**

**Navigation**

Expert → System → Administration → Def. access code → Confirm code

**Description**
Enter the defined release code a second time to confirm the release code.

**User entry**
0 to 9999

**Factory setting**
0

---

"Reset access code" submenu

**Navigation**

Expert → System → Administration → Reset acc. code

**Description**
Use this function to display the length of time the device has been in operation.

**User interface**
Days (d), hours (h), minutes (m) and seconds (s)

**Additional information**
User interface
The maximum number of days is 9999, which is equivalent to 27 years.

---

**Operating time**

**Navigation**

Expert → System → Administration → Reset acc. code → Operating time (0652)

**Description**
Use this function to display the length of time the device has been in operation.

**User interface**
Days (d), hours (h), minutes (m) and seconds (s)

**Additional information**
User interface
The maximum number of days is 9999, which is equivalent to 27 years.

---

**Reset access code**

**Navigation**

Expert → System → Administration → Reset acc. code → Reset acc. code (0024)

**Description**
Use this function to enter a reset code to reset the user-specific access codes to the factory setting.

**User entry**
Character string comprising numbers, letters and special characters

**Factory setting**
0x00
Additional information  

**Description**

For a reset code, contact your Endress+Hauser service organization.

**User entry**

The reset code can only be entered via:

- Web browser
- DeviceCare, FieldCare (via CDI RJ45 interface)
- Fieldbus

---

**Additional parameters in the "Administration" submenu**

---

### Define access code

**Navigation**

Expert → System → Administration → Def. access code

**Description**

Use this function to enter a user-specific release code to restrict write-access to the parameters. This protects the configuration of the device against any inadvertent changes via the operating tool.

**User entry**

0 to 9999

**Factory setting**

0

**Additional information**

The write protection affects all parameters in the document marked with the symbol.

- Once the access code has been defined, write-protected parameters can only be modified if the access code is entered in the *Enter access code* parameter (→ 13).
- If you lose the access code, please contact your Endress+Hauser sales organization.

**User entry**

A message is displayed if the access code is not in the input range.

**Factory setting**

If the factory setting is not changed or 0 is defined as the access code, the parameters are not write-protected and the device configuration data can be modified. The user is logged on in the "Maintenance" role.

---

### Device reset

**Navigation**

Expert → System → Administration → Device reset (0000)

**Description**

Use this function to choose whether to reset the device configuration - either entirely or in part - to a defined state.
Description of Device Parameters

Selection

- Cancel
- To delivery settings
- Restart device
- Restore S-DAT backup *

Factory setting  
Cancel

Activate SW option

Navigation  
Expert → System → Administration → Activate SW opt. (0029)

Description  
Use this function to enter an activation code to enable an additional, ordered software option.

User entry  
Max. 10-digit string consisting of numbers.

Factory setting  
Depends on the software option ordered

Additional information

Description

If a measuring device was ordered with an additional software option, the activation code is programmed in the device at the factory.

User entry

To activate a software option subsequently, please contact your Endress+Hauser sales organization.

NOTE!

The activation code is linked to the serial number of the measuring device and varies according to the device and software option.

If an incorrect or invalid code is entered, this results in the loss of software options that have already been activated.

- Before you enter a new activation code, make a note of the current activation code .
- Enter the new activation code provided by Endress+Hauser when the new software option was ordered.
- Once the activation code has been entered, check if the new software option is displayed in the Software option overview parameter (→ 39).
- The new software option is active if it is displayed.
- If the new software option is not displayed or all software options have been deleted, the code entered was either incorrect or invalid.
- If the code entered is incorrect or invalid, enter the old activation code .

* Visibility depends on order options or device settings
▸ Have your Endress+Hauser sales organization check the new activation code remembering to specify the serial number or ask for the code again.

Example for a software option
Order code for "Application package", option EA "Extended HistoROM"

![The software options currently enabled are displayed in the Software option overview parameter (→ 39).](image)

Web browser

![Once a software option has been activated, the page must be loaded again in the Web browser.](image)

Software option overview

**Navigation**

Expert → System → Administration → SW option overv. (0015)

**Description**

Displays all the software options that are enabled in the device.

**User interface**

- Extended HistoROM
- 4-20mA, 2x pulse/freq./switch output
- 4-20mA, switch/certified pulse output
- Electrode cleaning circuit
- Heartbeat Verification
- Custody transfer
- Build-up index
- Heartbeat Monitoring

**Additional information**

Description

Displays all the options that are available if ordered by the customer.

*Extended HistoROM* option

Order code for "Application package", option EA "Extended HistoROM"

*Electrode cleaning circuit* option

![Only available for Promag L and W.](image)

Order code for "Application package", option EC "ECC electrode cleaning"

*Heartbeat Verification* option and *Heartbeat Monitoring* option

Order code for "Application package", option EB "Heartbeat Verification + Monitoring"
3.2 "Sensor" submenu

Navigation  

Expert → Sensor

- Measured values → 40
- System units → 47
- Process parameters → 55
- External compensation → 71
- Sensor adjustment → 73
- Calibration → 80

3.2.1 "Measured values" submenu

Navigation  

Expert → Sensor → Measured val.

- Process variables → 40
- Totalizer → 43
- Output values → 45

"Process variables" submenu

Navigation  


- Volume flow (1838) → 41
- Mass flow (1847) → 41
- Corrected volume flow (1851) → 41
- Flow velocity (1854) → 42
- Conductivity (1850) → 42
- Corrected conductivity (1853) → 42
<table>
<thead>
<tr>
<th>Description of Device Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Volume flow</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>User interface</strong></td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
</tr>
</tbody>
</table>

| **Mass flow**                    |
| **Description**                  | Displays the mass flow that is currently calculated. |
| **User interface**               | Signed floating-point number |
| **Additional information**       | **Dependency** The unit is taken from the Mass flow unit parameter (→ 52) |

| **Corrected volume flow**        |
| **Description**                  | Displays the corrected volume flow that is currently measured. |
| **User interface**               | Signed floating-point number |
| **Additional information**       | **Dependency** The unit is taken from the Corrected volume flow unit parameter (→ 54) |
## Flow velocity

**Navigation**

富豪

**Description**

Displays the flow velocity that is currently calculated.

**User interface**

Signed floating-point number

## Conductivity

**Navigation**

富豪

**Prerequisite**

The **On** option is selected in the **Conductivity measurement** parameter (→ 59).

**Description**

Displays the conductivity that is currently measured.

**User interface**

Signed floating-point number

**Additional information**

*Dependency*

The unit is taken from the **Conductivity unit** parameter (→ 50)

## Corrected conductivity

**Navigation**

富豪

**Prerequisite**

The following conditions are met:

- The **On** option is selected in the **Conductivity measurement** parameter (→ 59).
- The **Internal temperature sensor** option or the **External value** option is selected in the **Temperature source** parameter (→ 72).

**Description**

Displays the conductivity that is currently corrected.

**User interface**

Positive floating-point number

**Additional information**

*Dependency*

The unit is taken from the **Conductivity unit** parameter (→ 50)

## Temperature

**Navigation**

富豪

**Prerequisite**

The **Internal temperature sensor** option or the **External value** option is selected in the **Temperature source** parameter (→ 72).
**Description**
Displays the temperature that is currently calculated.

**User interface**
Positive floating-point number

**Additional information**
*Dependence*

The unit is taken from the **Temperature unit** parameter (→ 51)

---

**Density**

**Navigation**


**Description**
Displays the current fixed density or density read in from an external device.

**User interface**
Signed floating-point number

**Additional information**
*Dependence*

The unit is taken from the **Density unit** parameter (→ 53)

---

"Totalizer" submenu

**Navigation**

Expert → Sensor → Measured val. → Totalizer

**Prerequisite**
One of the following options is selected in the **Assign process variable** parameter (→ 130) of the **Totalizer 1 to n** submenu:
- Volume flow
- Mass flow
- Corrected volume flow

**Description**
Displays the current totalizer counter reading.

**User interface**
Signed floating-point number
Additional information

Description

As the operating tool can only display a maximum of 7 digits, if the display range is exceeded the current counter reading is the sum of the totalizer value and the overflow value from the Totalizer overflow 1 to n parameter.

In the event of an error, the totalizer adopts the mode defined in the Failure mode parameter (→ 133).

User interface

The value of the process variable totalized since measuring began can be positive or negative. This depends on the settings in the Totalizer operation mode parameter (→ 131).

The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→ 130).

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range of the operating tool:

- Value in the Totalizer value 1 parameter: 1\,968\,457\,m³
- Value in the Totalizer overflow 1 parameter: 1 \cdot 10^7 (1 overflow) = 10\,000\,000\,m³
- Current totalizer reading: 11\,968\,457\,m³

Totalizer overflow 1 to n

Navigation

Expert → Sensor → Measured val. → Totalizer → Tot. overflow 1 to n (0910–1 to n)

Prerequisite

One of the following options is selected in the Assign process variable parameter (→ 130) of the Totalizer 1 to n submenu:

- Volume flow
- Mass flow
- Corrected volume flow

Description

Displays the current totalizer overflow.

User interface

Integer with sign

Additional information

Description

If the current totalizer reading exceeds 7 digits, which is the maximum value range that can be displayed by the operating tool, the value above this range is output as an overflow.
The current totalizer value is therefore the sum of the overflow value and the totalizer value from the Totalizer value 1 to n parameter.

User interface

The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→ 130).

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range of the operating tool:
- Value in the Totalizer value 1 parameter: 1968457 m³
- Value in the Totalizer overflow 1 parameter: 2 ⋅ 10⁷ (2 overflows) = 20000000 [m³]
- Current totalizer reading: 21968457 m³

"Output values" submenu

Navigation

Expert → Sensor → Measured val. → Output values

<table>
<thead>
<tr>
<th>Output values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output current 1 (0361–1)</td>
</tr>
<tr>
<td>Measured current 1 (0366–1)</td>
</tr>
<tr>
<td>Pulse output 1 (0456–1)</td>
</tr>
<tr>
<td>Output frequency 1 (0471–1)</td>
</tr>
<tr>
<td>Switch state 1 (0461–1)</td>
</tr>
<tr>
<td>Output frequency 2 (0471–2)</td>
</tr>
<tr>
<td>Pulse output 2 (0456–2)</td>
</tr>
<tr>
<td>Switch state 2 (0461–2)</td>
</tr>
</tbody>
</table>

Output current 1

Navigation

Expert → Sensor → Measured val. → Output values → Output curr. 1 (0361–1)

Description

Displays the current value currently calculated for the current output.

User interface

0 to 22.5 mA
### Measured current 1

**Navigation**

- Expert → Sensor → Measured val. → Output values → Measur. curr. 1 (0366–1)

**Description**

Displays the actual measured value of the output current.

**User interface**

0 to 30 mA

---

### Pulse output 1 to n

**Navigation**

- Expert → Sensor → Measured val. → Output values → Pulse output 1 (0456–1)
- Expert → Sensor → Measured val. → Output values → Pulse output 2 (0456–2)

**Prerequisite**

The **Pulse** option is selected in the **Operating mode** parameter (→ 95) parameter.

**Description**

Displays the pulse frequency currently output.

**User interface**

Positive floating-point number

**Additional information**

* Description

- The pulse output is an open collector output.
- This is configured at the factory in such a way that the transistor is conductive for the duration of the pulse (NO contact) and is safety-oriented.
- The **Value per pulse** parameter (→ 97) and **Pulse width** parameter (→ 98) can be used to define the value (i.e. the measured value amount that corresponds to a pulse) and the duration of the pulse.

![Diagram showing pulse output behavior]

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Non-conductive</td>
</tr>
<tr>
<td>1</td>
<td>Conductive</td>
</tr>
<tr>
<td>NC</td>
<td>Normally closed</td>
</tr>
<tr>
<td>NO</td>
<td>Normally opened</td>
</tr>
</tbody>
</table>

The output behavior can be reversed via the **Invert output signal** parameter (→ 112) i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of a device alarm (**Failure mode** parameter (→ 99)) can be configured.
### Output frequency 1 to n

**Navigation**
- Expert → Sensor → Measured val. → Output values → Output freq. 1 (0471–1)
- Expert → Sensor → Measured val. → Output values → Output freq. 2 (0471–2)

**Prerequisite**
In the **Operating mode** parameter (→ 95), the **Frequency** option is selected.

**Description**
Displays the actual value of the output frequency which is currently measured.

**User interface**
0.0 to 12500.0 Hz

---

### Switch state 1 to n

**Navigation**
- Expert → Sensor → Measured val. → Output values → Switch state 1 (0461–1)
- Expert → Sensor → Measured val. → Output values → Switch state 2 (0461–2)

**Prerequisite**
In the **Operating mode** parameter (→ 95), the **Switch** option is selected.

**Description**
Displays the current switch status of the status output.

**User interface**
- Open
- Closed

**Additional information**
*Selection*
- Open
  The switch output is not conductive.
- Closed
  The switch output is conductive.

---

### 3.2.2 "System units" submenu

**Navigation**
- Expert → Sensor → System units

```
System units

Volume flow unit (0553) → 48
Volume unit (0563) → 50
Conductivity unit (0582) → 50
Temperature unit (0557) → 51
Mass flow unit (0554) → 52
```
Volume flow unit

Navigation

Use this function to select the unit for the volume flow.
Proline Promag 400 Modbus RS485

Description of Device Parameters

### Selection

**SI units**
- cm³/s
- cm³/min
- cm³/h
- cm³/d
- dm³/s
- dm³/min
- dm³/h
- dm³/d
- m³/s
- m³/min
- m³/h
- m³/d
- ml/s
- ml/min
- ml/h
- ml/d
- l/s
- l/min
- l/h
- l/d
- hl/s
- hl/min
- hl/h
- hl/d
- Ml/s
- Ml/min
- Ml/h
- Ml/d

**US units**
- af/s
- af/min
- af/h
- af/d
- ft³/s
- ft³/min
- ft³/h
- ft³/d
- Mft³/s
- Mft³/min
- Mft³/h
- Mft³/d
- fl oz/s (us)
- fl oz/min (us)
- fl oz/h (us)
- fl oz/d (us)

**Imperial units**
- gal/s (imp)
- gal/min (imp)
- gal/h (imp)
- gal/d (imp)
- Mgal/s (imp)
- Mgal/min (imp)
- Mgal/h (imp)
- Mgal/d (imp)
- bbl/s (imp;beer)
- bbl/min (imp;beer)
- bbl/h (imp;beer)
- bbl/d (imp;beer)
- bbl/s (imp;oil)
- bbl/min (imp;oil)
- bbl/h (imp;oil)
- bbl/d (imp;oil)

**Factory setting**

Country-specific:
- l/h
- gal/min (us)
Additional information

Effect
The selected unit applies for:
**Volume flow** parameter (→ 41)

Selection

For an explanation of the abbreviated units: → 172

Customer-specific units

The unit for the customer-specific volume is specified in the **User volume text** parameter.

**Volume unit**

**Navigation**

Expert → Sensor → System units → Volume unit (0563)

**Description**

Use this function to select the unit for the volume.

**Selection**

**SI units**
- cm³
- dm³
- m³
- ml
- l
- hl
- Ml Mega

**US units**
- af
- ft³
- Mft³
- fl oz (us)
- gal (us)
- kgal (us)
- Mgal (us)
- bbl (us;oil)
- bbl (us;liq.)
- bbl (us;beer)
- bbl (us;tank)

**Imperial units**
- gal (imp)
- Mgal (imp)
- bbl (imp;beer)
- bbl (imp;oil)

**Factory setting**

Country-specific:
- m³
- gal (us)

**Additional information**

Selection

For an explanation of the abbreviated units: → 172

Customer-specific units

The unit for the customer-specific volume is specified in the **User volume text** parameter.

**Conductivity unit**

**Navigation**

Expert → Sensor → System units → Conductiv. unit (0582)

**Prerequisite**

The **On** option is selected in the **Conductivity measurement** parameter (→ 59) parameter.
**Description**

Use this function to select the unit for the conductivity.

**Selection**

*SI units*
- nS/cm
- µS/cm
- µS/m
- µS/mm
- mS/m
- mS/cm
- S/cm
- S/m
- kS/m
- MS/m

**Factory setting**

µS/cm

**Additional information**

*Effect*

The selected unit applies for:
- **Conductivity** parameter (→ 42)

*Selection*

For an explanation of the abbreviated units: → 172

---

**Temperature unit**

**Navigation**

[Expert → Sensor → System units → Temperature unit (0557)]

**Description**

Use this function to select the unit for the temperature.

**Selection**

*SI units*  
- °C
- K

*US units*  
- °F
- °R

**Factory setting**

Country-specific:
- °C
- °F

**Additional information**

*Effect*

The selected unit applies for:
- **Maximum value** parameter (→ 158)
- **Minimum value** parameter (→ 158)

*Selection*

For an explanation of the abbreviated units: → 172
## Mass flow unit

### Description
Use this function to select the unit for the mass flow.

### Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>g/s</td>
<td>oz/s</td>
</tr>
<tr>
<td>g/min</td>
<td>oz/min</td>
</tr>
<tr>
<td>g/h</td>
<td>oz/h</td>
</tr>
<tr>
<td>g/d</td>
<td>oz/d</td>
</tr>
<tr>
<td>kg/s</td>
<td>lb/s</td>
</tr>
<tr>
<td>kg/min</td>
<td>lb/min</td>
</tr>
<tr>
<td>kg/h</td>
<td>lb/h</td>
</tr>
<tr>
<td>kg/d</td>
<td>lb/d</td>
</tr>
<tr>
<td>t/s</td>
<td>STon/s</td>
</tr>
<tr>
<td>t/min</td>
<td>STon/min</td>
</tr>
<tr>
<td>t/h</td>
<td>STon/h</td>
</tr>
<tr>
<td>t/d</td>
<td>STon/d</td>
</tr>
</tbody>
</table>

### Factory setting
Country-specific:
- kg/h
- lb/min

### Additional information

**Effect**
The selected unit applies for:
- Mass flow parameter (→ 41)

**Selection**
- For an explanation of the abbreviated units: → 172

**Customer-specific units**
- The unit for the customer-specific mass is specified in the User mass text parameter.

## Mass unit

### Description
Use this function to select the unit for the mass.

### Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>g</td>
<td>oz</td>
</tr>
<tr>
<td>kg</td>
<td>lb</td>
</tr>
<tr>
<td>t</td>
<td>STon</td>
</tr>
</tbody>
</table>

### Factory setting
Country-specific:
- kg
- lb
Additional information

Selection

For an explanation of the abbreviated units: →  172

Customer-specific units

The unit for the customer-specific mass is specified in the User mass text parameter.

Density unit

Navigation

Expert → Sensor → System units → Density unit (0555)

Description

Use this function to select the unit for the density.

Selection

SI units

- g/cm³
- g/m³
- kg/l
- kg/dm³
- kg/m³
- SD4°C
- SD15°C
- SD20°C
- SG4°C
- SG15°C
- SG20°C

US units

- lb/ft³
- lb/gal (us)
- lb/bbl (us;liq.)
- lb/bbl (us;beer)
- lb/bbl (us;oil)
- lb/bbl (us;tank)

Imperial units

- lb/gal (imp)
- lb/bbl (imp;beer)
- lb/bbl (imp;oil)

Factory setting

Country-specific:

- kg/l
- lb/ft³

Additional information

Effect

The selected unit applies for:

- External density parameter (→  71)
- Fixed density parameter (→  72)

Selection

- SD = specific density
  The specific density is the ratio of the medium density to the water density at a water temperature of +4 °C (+39 °F), +15 °C (+59 °F), +20 °C (+68 °F).
- SG = specific gravity
  The specific gravity is the ratio of the medium density to the water density at a water temperature of +4 °C (+39 °F), +15 °C (+59 °F), +20 °C (+68 °F).

For an explanation of the abbreviated units: →  172
Corrected volume flow unit

**Navigation**

Expert → Sensor → System units → Corr. volflow unit (0558)

**Description**

Use this function to select the unit for the corrected volume flow.

**Selection**

**SI units**
- Nl/s
- Nl/min
- Nl/h
- Nl/d
- Nh/s
- Nh/min
- Nh/h
- Nh/d
- Nm³/s
- Nm³/min
- Nm³/h
- Nm³/d
- Sl/s
- Sl/min
- Sl/h
- Sl/d
- Sm³/s
- Sm³/min
- Sm³/h
- Sm³/d

**US units**
- Sft³/s
- Sft³/min
- Sft³/h
- Sft³/d
- MMSft³/s
- MMSft³/min
- MMSft³/h
- MMSft³/d

**Imperial units**
- Sgal/s (imp)
- Sgal/min (imp)
- Sgal/h (imp)
- Sgal/d (imp)

**Factory setting**

Country-specific:
- Nl/h
- Sft³/h

**Additional information**

Selection

For an explanation of the abbreviated units: →  172

Corrected volume unit

**Navigation**

Expert → Sensor → System units → Corr. vol. unit (0575)

**Description**

Use this function to select the unit for the corrected volume.

**Selection**

**SI units**
- Nl
- Nh
- Nm³
- Sl
- Sm³

**US units**
- Sft³
- MMSft³
- Sgal (us)
- Sbbl (us;liq.)

**Imperial units**
- Sgal (imp)
- Sgal (us)
- Sbbl (us;liq.)

**Factory setting**

Country-specific:
- Nm³
- Sft³
Additional information

Selection

For an explanation of the abbreviated units: → 172

Date/time format

Navigation

Expert → Sensor → System units → Date/time format (2812)

Description

Use this function to select the desired time format for calibration history.

Selection

• dd.mm.yy hh:mm
• dd.mm.yy hh:mm am/pm
• mm/dd/yy hh:mm
• mm/dd/yy hh:mm am/pm

Factory setting

dd.mm.yy hh:mm

Additional information

Selection

For an explanation of the abbreviated units: → 172

3.2.3 "Process parameters" submenu

Navigation


Process parameters

Filter options (6710) → 56
Flow damping (6661) → 58
Flow override (1839) → 58
Conductivity measurement (6514) → 59
Conductivity damping (1803) → 59
Conductivity temperature coefficient (1891) → 60
Temperature damping (1886) → 60
Reference density (1885) → 60
Low flow cut off → 61
Filter options

Navigation
Expert → Sensor → Process param. → Filter options (6710)

Description
Use this function to select a filter option.

Selection
- Adaptive
- Adaptive CIP on
- Dynamic
- Dynamic CIP on
- Binomial
- Binomial CIP on

Factory setting
Binomial

Additional information
Description
The user can choose from a range of filter combinations which can optimize the measurement result depending on the application. Each change in the filter setting affects
the output signal of the measuring device. The response time of the output signal increases as the filter depth increases.

**Selection**

- **Standard**
  - Strong flow damping with a short output signal response time.
  - Some time is needed before a stable output signal can be generated.
  - Not suitable for pulsating flow as the average flow can be different here.

- **Dynamic**
  - Average flow damping with a delayed output signal response time.
  - The average flow is displayed correctly over a measuring interval determined over a long period.

- **Binomial**
  - Weak flow damping with a short output signal response time.
  - The average flow is displayed correctly over a measuring interval determined over a long period.

- **CIP**
  - This filter makes the **Standard** and **Dynamic** filter options additionally available.
  - If the CIP filter has detected a change in the medium (abrupt increase in the noise level, e.g. quickly changing medium conductivity values during CIP cleaning), flow damping is greatly increased and the raw value (before flow damping) is limited by the mean value (delimiter). This eliminates extremely high measured errors (up to several 100 m/s).
  - If the CIP filter is enabled, the response time of the entire measuring system increases and the output signal is delayed accordingly.

**Examples**

**Possible applications for the filters**

<table>
<thead>
<tr>
<th>Application</th>
<th>Standard</th>
<th>Standard CIP</th>
<th>Dynamic</th>
<th>Dynamic CIP</th>
<th>Binomial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulsating flow (flow is negative intermittently)</td>
<td>–––</td>
<td>–––</td>
<td>++</td>
<td>–––</td>
<td>++</td>
</tr>
<tr>
<td>Flow changes frequently (flow is dynamic)</td>
<td>–</td>
<td>–––</td>
<td>++</td>
<td>–––</td>
<td>++</td>
</tr>
<tr>
<td>Clear signal, fast control loop (&lt; 1 s)</td>
<td>–––</td>
<td>–––</td>
<td>+ 1)</td>
<td>–––</td>
<td>++</td>
</tr>
<tr>
<td>Poor signal, slow control loop (response time of a few seconds)</td>
<td>++</td>
<td>–––</td>
<td>–––</td>
<td>–––</td>
<td>–––</td>
</tr>
<tr>
<td>Permanently bad signal</td>
<td>++</td>
<td>–––</td>
<td>–––</td>
<td>–––</td>
<td>–––</td>
</tr>
<tr>
<td>Short and severe signal distortion after a while</td>
<td>++</td>
<td>–––</td>
<td>–––</td>
<td>–––</td>
<td>–––</td>
</tr>
<tr>
<td>Replacement of a Promag 50/53: system damping Promag 400 = 0.5 * system damping Promag 50/53</td>
<td>+++</td>
<td>+++</td>
<td>–––</td>
<td>–––</td>
<td>–––</td>
</tr>
<tr>
<td>Replacement of a Promag 10: system damping Promag 400 = system damping Promag 10 + 2</td>
<td>+++</td>
<td>+++</td>
<td>–––</td>
<td>–––</td>
<td>–––</td>
</tr>
<tr>
<td>For a stable flow signal (no other requirements)</td>
<td>+++</td>
<td>+++</td>
<td>–––</td>
<td>–––</td>
<td>–––</td>
</tr>
</tbody>
</table>

1) Value of flow damping < 6
**Flow damping**

**Navigation**

Expert → Sensor → Process param. → Flow damping (6661)

**Description**

Use this function to enter a value for flow damping. Reduction of the variability of the flow measured value (in relation to interference). For this purpose, the depth of the flow filter is adjusted: when the filter setting increases, the reaction time of the device also increases.

**User entry**

0 to 15

**Factory setting**

4

**Additional information**

*Input range 0 to 15*

- Value = 0: no damping
- Value = 1: minor damping
- Value = 15: strong damping

- The damping depends on the measuring period and the filter type selected.
- An increase or decrease in the damping depends on the application.

**Effect**

The damping affects the following variables of the device:

- Outputs → 81
- Low flow cut off → 61
- Totalizers → 129

---

**Flow override**

**Navigation**


**Description**

Use this function to select whether to interrupt the evaluation of measured values. This is useful for the cleaning processes of a pipeline, for example.

**Selection**

- Off
- On

**Factory setting**

Off

**Additional information**

*Result*

This setting affects all the functions and outputs of the measuring device.

**Description**

**Flow override is active**

- The 453 Flow override diagnostic message is output.
- Output values
  - Output: value at zero flow
  - Temperature: continues to be output
  - Totalizers 1-3: stop being totalized

- The Flow override option can also be activated in the Status input submenu: Assign status input parameter.
**Conductivity measurement**

**Navigation**


**Prerequisite**

The **On** option is selected in the **Conductivity measurement** parameter (→ [59]).

**Description**

Use this function to enable and disable conductivity measurement.

**Selection**

- **Off**
- **On**

**Factory setting**

**Off**

**Additional information**

**Description**

For conductivity measurement to work, the medium must have a minimum conductivity of 5 µS/cm.

---

**Conductivity damping**

**Navigation**

[Expert → Sensor → Process param. → Conduct. damping (1803)]

**Prerequisite**

The **On** option is selected in the **Conductivity measurement** parameter (→ [59]).

**Description**

Use this function to enter a time constant for conductivity damping (PT1 element).

**User entry**

0 to 999.9 s

**Factory setting**

0 s

**Additional information**

**Description**

The damping is performed by a PT1 element 2).

**User entry**

- **Value = 0**: no damping
- **Value > 0**: damping is increased

Damping is switched off if 0 is entered (factory setting).

---

2) Proportional behavior with first-order lag
**Conductivity temperature coefficient**

**Navigation**


**Prerequisite**

The Internal temperature sensor option or the External value option is selected in the Temperature source parameter (→ 72).

**Description**

Use this function to enter the temperature coefficient for the conductivity.

**User entry**

Signed floating-point number

**Factory setting**

2.1 %/K

---

**Temperature damping**

**Navigation**


**Prerequisite**

The Internal temperature sensor option or the External value option is selected in the Temperature source parameter (→ 72).

**Description**

Use this function to enter the time constant for temperature damping.

**User entry**

0 to 999.9 s

**Factory setting**

0 s

---

**Reference density**

**Navigation**

Expert → Sensor → Process param. → Ref.density (1885)

**Description**

Use this function to enter a fixed value for the reference density.

**User entry**

Positive floating-point number

**Factory setting**

Country-specific:
- 1 kg/l
- 1 lb/ft³

**Additional information**

*Dependency*

The unit is taken from the Density unit parameter (→ 53)
"Low flow cut off" submenu

**Navigation**

Expert → Sensor → Process param. → Low flow cut off

![Low flow cut off]

- Assign process variable (1837) → 61
- On value low flow cutoff (1805) → 61
- Off value low flow cutoff (1804) → 62
- Pressure shock suppression (1806) → 62

---

### Assign process variable

**Navigation**

Expert → Sensor → Process param. → Low flow cut off → Assign variable (1837)

**Description**

Use this function to select the process variable for low flow cutoff detection.

**Selection**

- Off
- Volume flow
- Mass flow
- Corrected volume flow

**Factory setting**

Volume flow

---

### On value low flow cutoff

**Navigation**

Expert → Sensor → Process param. → Low flow cut off → On value (1805)

**Prerequisite**

A process variable is selected in the **Assign process variable** parameter (→ 61).

**Description**

Use this function to enter a switch-on value for low flow cutoff. Low flow cutoff is activated if the value entered is not equal to 0 → 62.

**User entry**

Positive floating-point number

**Factory setting**

Depends on country and nominal diameter → 168

**Additional information**

Dependency

The unit depends on the process variable selected in the **Assign process variable** parameter (→ 61).
Off value low flow cutoff

**Navigation**

Expert → Sensor → Process param. → Low flow cut off → Off value (1804)

**Prerequisite**

A process variable is selected in the **Assign process variable** parameter (→  61).

**Description**

Use this function to enter a switch-off value for low flow cut off. The off value is entered as a positive hysteresis from the on value→  61.

**User entry**

0 to 100.0 %

**Factory setting**

50 %

**Additional information**

*Example*

![Diagram]

<table>
<thead>
<tr>
<th>Q</th>
<th>Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>Time</td>
</tr>
<tr>
<td>H</td>
<td>Hysteresis</td>
</tr>
<tr>
<td>A</td>
<td>Low flow cut off active</td>
</tr>
<tr>
<td>1</td>
<td>Low flow cut off is activated</td>
</tr>
<tr>
<td>2</td>
<td>Low flow cut off is deactivated</td>
</tr>
<tr>
<td>3</td>
<td>On value entered</td>
</tr>
<tr>
<td>4</td>
<td>Off value entered</td>
</tr>
</tbody>
</table>

Pressure shock suppression

**Navigation**


**Prerequisite**

A process variable is selected in the **Assign process variable** parameter (→  61).

**Description**

Use this function to enter the time interval for signal suppression (= active pressure shock suppression).

**User entry**

0 to 100 s

**Factory setting**

0 s

**Additional information**

*Description*

**Pressure shock suppression is enabled**

- Prerequisite:
  - Flow rate < on-value of low flow cut off
- Output values
  - Flow displayed: 0
  - Totalizer: the totalizers are pegged at the last correct value
**Pressure shock suppression is disabled**

- Prerequisite: the time interval set in this function has elapsed.
- If the flow also exceeds the switch-off value for low flow cut off, the device starts processing the current flow value again and displays it.

**Example**

When closing a valve, momentarily strong fluid movements may occur in the pipeline, which are registered by the measuring system. These totalized flow values lead to a false totalizer status, particularly during batching processes.

![Diagram of Pressure Shock Suppression](image.png)

- **Q**: Flow
- **t**: Time
- **A**: Drip
- **B**: Pressure shock
- **C**: Pressure shock suppression active as per the time entered
- **D**: Pressure shock suppression inactive

1. Valve closes
2. Flow falls below the on-value of the low flow cut off; pressure shock suppression is activated
3. The time entered has elapsed; pressure shock suppression is deactivated
4. The actual flow value is processed again and output
5. On-value for low flow cut off
6. Off-value for low flow cut off

---

"Empty pipe detection" submenu

**Navigation**  

- **Empty pipe detection**

  - Assign process variable (1860) → 64
  - Switch point empty pipe detection (6562) → 64
### Description of Device Parameters

**Proline Promag 400 Modbus RS485**

#### Assign process variable

**Navigation**

**Description**
Use this function to switch empty pipe detection on and off.

**Selection**
- Off
- On

**Factory setting**
Off

#### Switch point empty pipe detection

**Navigation**
- Expert → Sensor → Process param. → Empty pipe det. → Switch point EPD (6562)

**Prerequisite**
The **On** option is selected in the **Empty pipe detection** parameter (→ 64).

**Description**
Use this function to enter the percentage threshold value of the resistance in relation to the adjustment values.

**User entry**
0 to 100 %

**Factory setting**
50 %

#### Response time empty pipe detection

**Navigation**

**Prerequisite**
A process variable is selected in the **Assign process variable** parameter (→ 64).
**Description**
Use this function to enter the minimum length of time (debouncing time) the signal must be present for the **Pipe empty** diagnostic message to be triggered if the measuring pipe is empty or partially full.

**User entry**
0 to 100 s

**Factory setting**
1 s

**New adjustment**

**Navigation**


**Prerequisite**
The **On** option is selected in the **Empty pipe detection** parameter (→ 64).

**Description**
For selecting whether to perform an empty pipe or full pipe adjustment.

**Selection**
- Cancel
- Empty pipe adjust
- Full pipe adjust

**Factory setting**
Cancel

**Progress**

**Navigation**


**Prerequisite**
The **On** option is selected in the **Empty pipe detection** parameter (→ 64).

**Description**
Use this function to view the progress.

**User interface**
- Ok
- Busy
- Not ok

**Empty pipe adjust value**

**Navigation**

Expert → Sensor → Process param. → Empty pipe det. → Empty pipe value (6527)

**Prerequisite**
- In the **Empty pipe detection** parameter (→ 64), the **On** option is selected.
- Adjustment value > full pipe value.

**Description**
Displays the adjustment value when the measuring pipe is empty.

**User interface**
Positive floating-point number
### Full pipe adjust value

**Navigation**  

**Prerequisite**  
- In the Empty pipe detection parameter (→ 64), the **On** option is selected.
- Adjustment value < empty pipe value.

**Description**  
Displays the adjustment value when the measuring pipe is full.

**User interface**  
Positive floating-point number

### Measured value EPD

**Navigation**  

**Prerequisite**  
In the Empty pipe detection parameter (→ 64), the **On** option is selected.

**Description**  
Displays the current measured value.

**User interface**  
Positive floating-point number

---

### "Electrode cleaning circuit" submenu

**Navigation**  
Expert → Sensor → Process param. → ECC

| Electrode cleaning cycle (6528) | → 67 |
| ECC duration (6555) | → 67 |
| ECC recovery time (6556) | → 67 |
| ECC interval (6557) | → 68 |
| ECC polarity (6631) | → 68 |
### Electrode cleaning cycle

**Navigation**

Navigate through:

- Expert → Sensor → Process param. → ECC → Elec. clean cycl (6528)

**Prerequisite**

For the following order code:

- "Application package", option EC "ECC electrode cleaning"

**Description**

Use this function to enable and disable cyclic electrode cleaning.

**Selection**

- Off
- On

**Factory setting**

Off

**Additional information**

Conductive deposits on the electrodes and on the walls of the measuring tube (e.g., magnetite) can falsify measurement values. The Electrode Cleaning Circuitry (ECC) was developed to prevent such conductive deposits developing in the vicinity of the electrodes. ECC functions as described above for all available electrode materials except tantalum. If tantalum is used as the electrode material, the ECC protects the electrode surface only against oxidation.

### ECC duration

**Navigation**

Navigate through:

- Expert → Sensor → Process param. → ECC → ECC duration (6555)

**Prerequisite**

For the following order code:

- "Application package", option EC "ECC electrode cleaning"

**Description**

Use this function to enter the duration of electrode cleaning in seconds.

**User entry**

0.01 to 30 s

**Factory setting**

2 s

### ECC recovery time

**Navigation**

Navigate through:

- Expert → Sensor → Process param. → ECC → ECC recov. time (6556)

**Prerequisite**

For the following order code:

- "Application package", option EC "ECC electrode cleaning"

**Description**

Use this function to enter the recovery time after electrode cleaning to prevent signal output interference. The current output values are frozen in the meanwhile.

**User entry**

1 to 600 s

**Factory setting**

5 s
**ECC interval**

**Navigation**
Expert → Sensor → Process param. → ECC → ECC interval (6557)

**Prerequisite**
For the following order code:
*Application package*, option EC "ECC electrode cleaning"

**Description**
Use this function to enter the pause duration until the next electrode cleaning.

**User entry**
0.5 to 168 h

**Factory setting**
0.7 h

---

**ECC polarity**

**Navigation**
Expert → Sensor → Process param. → ECC → ECC polarity (6631)

**Prerequisite**
For the following order code:
*Application package*, option EC "ECC electrode cleaning"

**Description**
Displays the polarity of the electrode cleaning circuit.

**User interface**
- Positive
- Negative

**Factory setting**
Depends on the electrode material:
- Tantalum: **Negative** option
- Platinum, Alloy C22, stainless steel: **Positive** option

---

**"Coating detection" submenu**

Build-up detection is only available:
- In conjunction with the Promag W sensor
- In the compact device version (transmitter and sensor form a mechanical unit)
- For detailed information on build-up detection: see the Special Documentation for the Heartbeat Verification + Monitoring application package → 7

**Navigation**

- Build-up index → 69
- Build-up index damping → 69
- Build-up index value → 69
Build-up index

**Navigation**

专家 → 感应器 → 过程参数 → 建立指数 → 建立指数 (6734)

**Description**

选择建立指数的模式。

**Selection**

- Off
- Slow
- Standard
- Fast

**Factory setting**

Off

Build-up index damping

**Navigation**

专家 → 感应器 → 过程参数 → 建立指数 → BuildUpIndexDamp (6840)

**Description**

输入建立指数的阻尼值。

阻尼值:

- 0 = 最小阻尼
- 15 = 最大阻尼

阻尼值仅在测量值不稳定时才应增加。

**User entry**

0 to 15

**Factory setting**

0

Build-up index value

**Navigation**

专家 → 感应器 → 过程参数 → 建立指数 → 建立值 (12111)

**Description**

显示当前建立指数值。

**User interface**

0.0 to 100.0%

**Factory setting**

0.0%

**Additional information**

建立的形成以百分比输出在建立指数值 (→ 69) 参数。百分比越高，积累的厚度越厚。
Build-up index value (→ 69) = 0%
- No build-up present
- Measuring tube as-delivered state (initial value)
- Measuring tube was cleaned thoroughly after formation of build-up

Build-up index value (→ 69) = 100%
- Value for the maximum measurable build-up thickness
- The thickness of the build-up at 100% varies depending on the process
- A value of 100% should not be equated with a blocked measuring tube

The percentage indicated in the Build-up index value (→ 69) parameter does not provide direct information about the absolute thickness or the composition of the build-up. Therefore, to make optimum use of the build-up detection function, it is necessary to first compare the formation of build-up in the process, as known from experience, with the associated Build-up index value (→ 69). The aim is to determine the Build-up index value (→ 69) at the time the cleaning is usually performed.

On the basis of the Build-up index value (→ 69) during cleaning, it is possible to make a valid assessment of the condition inside the measuring tube and to plan the cleaning using the build-up limit and build-up detection hysteresis parameters.

In addition, conclusions about possible effects on neighboring processes can be drawn from the Build-up index value (→ 69).

### Build-up limit

| Description                                    | Enter limit value for the build-up index. |
| User entry                                     | 0 to 100 %                        |
| Factory setting                                | 50 %                              |

### Build-up limit hysteresis

| Description                                    | Enter hysteresis for build-up limit value. |
| If the value for build-up detection hysteresis is higher than the Build-up limit (→ 70), the "Build-up detected" diagnostic information is not reset until the measuring tube has been cleaned and a restart has been performed. |
| User entry                                     | 0 to 100 %                        |
| Factory setting                                | 20 %                              |
3.2.4 "External compensation" submenu

**Navigation**


**Density source**

**Navigation**

Expert → Sensor → External comp. → Density source (6615)

**Description**

Use this function to select the density source.

**Selection**

- Fixed density
- External density

**Factory setting**

Fixed density

**External density**

**Navigation**

Expert → Sensor → External comp. → External density (6630)

**Prerequisite**

The External density option is selected in the Density source parameter (→ 71).

**Description**

Use this function to enter the density read in from the external device.

**User entry**

Positive floating-point number

**Factory setting**

0 kg/l

**Additional information**

*Dependency*

The unit is taken from the Density unit parameter (→ 53)
**Fixed density**

**Navigation**

Expert → Sensor → External comp. → Fixed density (6623)

**Prerequisite**

The **Fixed density** option is selected in the **Density source** parameter (→ 71).

**Description**

Use this function to enter a fixed value for the density.

**User entry**

Positive floating-point number

**Factory setting**

Depends on country:

- 1000 kg/m³
- 62 lb/ft³

**Additional information**

*Dependency*

The unit is taken from the **Density unit** parameter (→ 53)

---

**Temperature source**

**Navigation**

Expert → Sensor → External comp. → Temp. source (6712)

**Description**

Use this function to select the temperature source.

**Selection**

- Internal temperature sensor *
- Off
- External value

**Factory setting**

Off

---

**External temperature**

**Navigation**


**Prerequisite**

The **External value** option is selected in the **Temperature source** parameter (→ 72).

**Description**

Use this function to enter the temperature read in from the external device.

**User entry**

Floating point number with sign

**Factory setting**

−273.15 °C

**Additional information**

*Dependency*

The unit is taken from the **Temperature unit** parameter (→ 51)

* Visibility depends on order options or device settings
Reference temperature

Navigation

Expert → Sensor → External comp. → Ref. temperature (1816)

Prerequisite

The Fixed density option or External density option are selected in the Density source parameter (→ 71).

Description

Use this function to enter a reference temperature for calculating the reference density.

User interface

-273.15 to 99999 °C

Factory setting

Country-specific:
- +20 °C
- +68 °F

Additional information

Dependency

The unit is taken from the Temperature unit parameter (→ 51)

Reference density calculation

\[ \rho_n = \rho \cdot (1 + \alpha \cdot \Delta t + \beta \cdot \Delta t^2) \]

- \( \rho_n \): reference density
- \( \rho \): fluid density currently measured
- \( t \): fluid temperature currently measured
- \( t_N \): reference temperature at which the reference density is calculated (e.g. 20 °C)
- \( \Delta t \): \( t - t_N \)
- \( \alpha \): linear expansion coefficient of the fluid, unit = [1/K]; \( K = \) Kelvin
- \( \beta \): square expansion coefficient of the fluid, unit = [1/K²]

3.2.5 "Sensor adjustment" submenu

Navigation

Description of Device Parameters

Proline Promag 400 Modbus RS485

### Installation direction

**Navigation**

Expert → Sensor → Sensor adjustm. → Install. direct. (1809)

**Description**

Use this function to change the sign of the medium flow direction.

**Selection**

- Forward flow
- Reverse flow

**Factory setting**

Forward flow

**Additional information**

Before changing the sign: ascertain the actual direction of fluid flow with reference to the direction indicated by the arrow on the sensor nameplate.

### Integration time

**Navigation**

Expert → Sensor → Sensor adjustm. → Integration time (6533)

**Description**

Displays the duration of the integration time.

The duration of the measuring period should always be longer than the duration of the integration time.

**User interface**

1 to 65 ms

### Measuring period

**Navigation**

Expert → Sensor → Sensor adjustm. → Measuring period (6536)

**Description**

Display the time of a full measuring period.

The duration of the measuring period should always be longer than the duration of the integration time.

**User interface**

2 to 1000 ms

### "Process variable adjustment" submenu

**Navigation**

Expert → Sensor → Sensor adjustm. → Variable adjust

<table>
<thead>
<tr>
<th>Process variable adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow offset (1831)</td>
</tr>
</tbody>
</table>
Volume flow factor

**Navigation**


**Description**

Use this function to enter a quantity factor (without time) for the volume flow. This multiplication factor is applied over the volume flow range.

**User entry**

Positive floating-point number

**Factory setting**

1

**Additional information**

*Description*

Corrected value = (factor × value) + offset
**Volume flow offset**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the zero point shift for the volume flow trim. The volume flow unit on which the shift is based is m³/s.</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0 m³/s</td>
</tr>
<tr>
<td>Additional information</td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td></td>
<td>Corrected value = (factor × value) + offset</td>
</tr>
</tbody>
</table>

**Mass flow factor**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter a quantity factor (without time) for the mass flow. This multiplication factor is applied over the mass flow range.</td>
</tr>
<tr>
<td>User entry</td>
<td>Positive floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>1</td>
</tr>
<tr>
<td>Additional information</td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td></td>
<td>Corrected value = (factor × value) + offset</td>
</tr>
</tbody>
</table>

**Mass flow offset**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the zero point shift for the mass flow trim. The mass flow unit on which the shift is based is kg/s.</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0 kg/s</td>
</tr>
<tr>
<td>Additional information</td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td></td>
<td>Corrected value = (factor × value) + offset</td>
</tr>
</tbody>
</table>
Conductivity offset

**Navigation**
Expert → Sensor → Sensor adjustm. → Variable adjust → Conduct. offset (1848)

**Prerequisite**
The On option is selected in the Conductivity measurement parameter (→ 59).

**Description**
Use this function to enter the zero point shift for the conductivity trim. The conductivity unit on which the shift is based is S/m.

**User entry**
Signed floating-point number

**Factory setting**
0 S/m

**Additional information**
Description
Corrected value = (factor × value) + offset

Conductivity factor

**Navigation**
Expert → Sensor → Sensor adjustm. → Variable adjust → Conduct. factor (1849)

**Prerequisite**
The On option is selected in the Conductivity measurement parameter (→ 59).

**Description**
Use this function to enter a quantity factor for the conductivity. This multiplication factor is applied over the conductivity range.

**User entry**
Positive floating-point number

**Factory setting**
1

**Additional information**
Description
Corrected value = (factor × value) + offset

Corrected volume flow offset

**Navigation**

**Description**
Use this function to enter the zero point shift for the corrected volume flow trim. The corrected volume flow unit on which the shift is based is 1 Nm³/s.

**User entry**
Signed floating-point number

**Factory setting**
0 Nm³/s

**Additional information**
Description
Corrected value = (factor × value) + offset
Corrected volume flow factor

**Navigation**


**Description**

Use this function to enter a quantity factor (without time) for the corrected volume flow. This multiplication factor is applied over the corrected volume flow range.

**User entry**

Positive floating-point number

**Factory setting**

1

**Additional information**

Description

Corrected value = (factor × value) + offset

Temperature offset

**Navigation**

Experts → Sensor → Sensor adjustm. → Variable adjust → Temp. offset (1868)

**Prerequisite**

The temperature is read into the flowmeter from an external device.

**Description**

Use this function to enter the zero point shift for the temperature trim. The temperature unit on which the shift is based is 1 K.

**User entry**

Signed floating-point number

**Factory setting**

0 K

**Additional information**

Description

Corrected value = (factor × value) + offset

Temperature factor

**Navigation**

Experts → Sensor → Sensor adjustm. → Variable adjust → Temp. factor (1869)

**Prerequisite**

The temperature is read into the flowmeter from an external device.

**Description**

Use this function to enter a quantity factor (without time) for the temperature. This multiplication factor is applied over the temperature range.

**User entry**

Positive floating-point number

**Factory setting**

1

**Additional information**

Description

Corrected value = (factor × value) + offset
## Corrected conductivity offset

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>The <strong>On</strong> option is selected in the <strong>Conductivity measurement</strong> parameter (→ 59)</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to enter the zero point shift to trim the corrected conductivity. The conductivity unit on which the shift is based is μS/cm.</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0 S/m</td>
</tr>
<tr>
<td>Additional information</td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td></td>
<td>Corrected value = (factor × value) + offset</td>
</tr>
</tbody>
</table>

## Corrected conductivity factor

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>The <strong>On</strong> option is selected in the <strong>Conductivity measurement</strong> parameter (→ 59)</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to enter a quantity factor for the corrected conductivity. In each case, this factor refers to the conductivity in μS/cm.</td>
</tr>
<tr>
<td>User entry</td>
<td>Positive floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>1</td>
</tr>
<tr>
<td>Additional information</td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td></td>
<td>Corrected value = (factor × value) + offset</td>
</tr>
</tbody>
</table>

## Flow velocity offset

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the zero point shift for the flow velocity trim. The flow velocity unit on which the shift is based is m/s.</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0 m/s</td>
</tr>
</tbody>
</table>
Additional information

Description
Corrected value = (factor × value) + offset

**Flow velocity factor**

**Navigation**


**Description**
Use this function to enter a quantity factor (without time) for the flow velocity. This multiplication factor is applied over the flow velocity range.

**User entry**
Positive floating-point number

**Factory setting**
1

**Additional information**

Description
Corrected value = (factor × value) + offset

---

**3.2.6 "Calibration" submenu**

**Navigation**

Expert → Sensor → Calibration

---

**Nominal diameter**

**Navigation**

Expert → Sensor → Calibration → Nominal diameter (2807)

**Description**
Displays the nominal diameter of the sensor.

**User interface**

DNxx / x'

**Factory setting**
Depends on the size of the sensor
Additional information

Description

The value is also specified on the sensor nameplate.

---

**Calibration factor**

**Navigation**

Expert → Sensor → Calibration → Cal. factor (6522)

**Description**

Displays the current calibration factor for the sensor.

**User interface**

Positive floating-point number

**Factory setting**

Depends on nominal diameter and calibration.

---

**Zero point**

**Navigation**

Expert → Sensor → Calibration → Zero point (6546)

**Description**

This function shows the zero point correction value for the sensor.

**User interface**

Signed floating-point number

**Factory setting**

Depends on nominal diameter and calibration

---

**Conductivity calibration factor**

**Navigation**

Expert → Sensor → Calibration → Cond. cal. fact. (6718)

**Prerequisite**

The On option is selected in the Conductivity measurement parameter (→ 59) parameter.

**Description**

Displays the calibration factor for the conductivity measurement.

**User interface**

0.01 to 10000

---

### 3.3 "Output" submenu

**Navigation**

Expert → Output
3.3.1 "Current output 1" submenu

Navigation

Expert → Output → Curr.output 1

**Process variable current output**

Navigation

Expert → Output → Curr.output 1 → Proc.var. outp (0359–1)

Description

Use this function to select a process variable for the current output.

Selection

- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
Proline Promag 400 Modbus RS485

Description of Device Parameters

- Conductivity *
- Corrected conductivity *
- Temperature *
- Electronics temperature
- Reference electrode potential against PE *
- Coil current shot time *
- Noise 
- Build-up index *
- Test point 1
- Test point 2
- Test point 3

Factory setting
Volume flow

Current range output

Navigation
Expert → Output → Curr.output 1 → Curr.range out (0353–1)

Description
Use this function to select the current range for the process value output and the upper and lower level for signal on alarm.

Selection
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)
- Fixed value

Factory setting
Country-specific:
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)

Additional information

- In the event of a device alarm, the current output adopts the value specified in the Failure mode parameter (→ 92).
- If the measured value is outside the measuring range, the S441 Current output 1 diagnostic message is displayed.
- The measuring range is specified via the 0/4 mA value parameter (→ 84) and 20 mA value parameter (→ 86).

*Fixed current* option

The current value is set via the Fixed current parameter (→ 84).

Example

Shows the relationship between the current range for the output of the process value and the lower and upper alarm levels:

* Visibility depends on order options or device settings
Description of Device Parameters

Proline Promag 400 Modbus RS485

Current range for process value
Lower level for signal on alarm
Upper level for signal on alarm

Selection

<table>
<thead>
<tr>
<th>Selection</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4...20 mA NE (3.8...20.5 mA)</td>
<td>3.8 to 20.5 mA</td>
<td>&lt; 3.6 mA</td>
<td>&gt; 21.95 mA</td>
</tr>
<tr>
<td>4...20 mA US (3.9...20.8 mA)</td>
<td>3.9 to 20.8 mA US</td>
<td>&lt; 3.6 mA</td>
<td>&gt; 21.95 mA</td>
</tr>
<tr>
<td>4...20 mA (4... 20.5 mA)</td>
<td>4 to 20.5 mA</td>
<td>&lt; 3.6 mA</td>
<td>&gt; 21.95 mA</td>
</tr>
<tr>
<td>0...20 mA (0... 20.5 mA)</td>
<td>0 to 20.5 mA</td>
<td>&lt; 0 mA</td>
<td>&gt; 21.95 mA</td>
</tr>
</tbody>
</table>

If the flow exceeds or falls below the upper or lower signal on alarm level, the \textbf{S441 Current output 1} diagnostic message is displayed.

Fixed current

Navigation

Expert → Output → Curr.output 1 → Fixed current (0365–1)

Prerequisite

The Fixed current option is selected in the Current span parameter (→ 83).

Description

Use this function to enter a constant current value for the current output.

User entry

0 to 22.5 mA

Factory setting

22.5 mA

Lower range value output

Navigation

Expert → Output → Curr.output 1 → Low.range outp (0367–1)

Prerequisite

One of the following options is selected in the Current span parameter (→ 83):

- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

Description

Use this function to enter a value for the 0/4 mA current.

User entry

Signed floating-point number
**Factory setting**

Country-specific:
- 0 l/h
- 0 gal/min (us)

**Additional information**

Description

Positive and negative values are permitted depending on the process variable assigned in the **Assign current output** parameter (→ 82). In addition, the value can be greater than or smaller than the value assigned for the 20 mA current in the **20 mA value** parameter (→ 86).

Dependency

The unit depends on the process variable selected in the **Assign current output** parameter (→ 82).

Current output behavior

The current output behaves differently depending on the settings configured in the following parameters:
- Current span (→ 83)
- Measuring mode (→ 87)
- Failure mode (→ 92)

Configuration examples

Some examples of parameter settings and their effect on the current output are given in the following section.

**Configuration example A**

Measurement mode with **Forward flow** option

- **0/4 mA value** parameter (→ 84) = not equal to zero flow (e.g. −250 m³/h)
- **20 mA value** parameter (→ 86) = not equal to zero flow (e.g. +750 m³/h)
- Calculated current value = 8 mA at zero flow

![Diagram showing current output behavior](AS013757)

<table>
<thead>
<tr>
<th>Q</th>
<th>Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>-250</td>
<td>0</td>
</tr>
<tr>
<td>+750</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>Measuring range is exceeded or undershot</td>
</tr>
</tbody>
</table>

The operational range of the measuring device is defined by the values entered for the **0/4 mA value** parameter (→ 84) and **20 mA value** parameter (→ 86). If the effective flow exceeds or falls below this operational range, the **ΔS441 Current output 1** diagnostic message is displayed.

**Configuration example B**

Measurement mode with **Forward/Reverse flow** option
The current output signal is independent of the direction of flow (absolute amount of the measured variable). The values for the 0/4 mA value parameter (→ 84) and 20 mA value parameter (→ 86) must have the same algebraic sign. The value for the 20 mA value parameter (→ 86) (e.g. reverse flow) corresponds to the mirrored value for the 20 mA value parameter (→ 86) (e.g. flow).

Configuration example C
Measurement mode with Reverse flow compensation option
If flow is characterized by severe fluctuations (e.g. when using reciprocating pumps), flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 s → 87.

Upper range value output

Navigation

Expert → Output → Curr.output 1 → Upp.range outp (0372–1)

Prerequisite

In the Current span parameter (→ 83), one of the following options is selected:

• 4...20 mA NE (3.8...20.5 mA)
• 4...20 mA US (3.9...20.8 mA)
• 4...20 mA (4... 20.5 mA)
• 0...20 mA (0... 20.5 mA)

Description

Use this function to enter a value for the 20 mA current.

User entry

Signed floating-point number

Factory setting

Depends on country and nominal diameter → 167

Additional information

Description

Positive and negative values are permitted depending on the process variable assigned in the Assign current output parameter (→ 82). In addition, the value can be greater.
than or smaller than the value assigned for the 0/4 mA current in the **0/4 mA value** parameter (→ 84).

**Dependency**

The unit depends on the process variable selected in the **Assign current output** parameter (→ 82).

**Example**

- Value assigned to 0/4 mA = –250 m³/h
- Value assigned to 20 mA = +750 m³/h
- Calculated current value = 8 mA (at zero flow)

If the **Forward/Reverse flow** option is selected in the **Measuring mode** parameter (→ 87), different signs cannot be entered for the values of the **0/4 mA value** parameter (→ 84) and **20 mA value** parameter (→ 86). The **S441 Current output 1** diagnostic message is displayed.

**Configuration examples**

Observe the configuration examples for the **0/4 mA value** parameter (→ 84).

---

### Measuring mode current output

<table>
<thead>
<tr>
<th>Navigation</th>
<th>专家 → 输出 → CURR.OUTPUT 1 → MEAS.MODE OUTP (0351–1)</th>
</tr>
</thead>
</table>
| Prerequisite | One of the following options is selected in the **Assign current output** parameter (→ 82):  
- Volume flow  
- Mass flow  
- Flow velocity  
One of the following options is selected in the **Current span** parameter (→ 83):  
- 4...20 mA NE (3.8...20.5 mA)  
- 4...20 mA US (3.9...20.8 mA)  
- 4...20 mA (4...20.5 mA)  
- 0...20 mA (0...20.5 mA) |
| Description | Use this function to select the measuring mode for the current output. |
| Selection |  
- Forward flow  
- Forward/Reverse flow *  
- Reverse flow compensation |
| Factory setting | Forward flow |
| Additional information | **Description**  
The process variable that is assigned to the current output via the **Assign current output** parameter (→ 82) is displayed below the parameter.  

*Forward flow* option

The current output signal is proportional to the process variable assigned. The measuring range is defined by the values that are assigned to the 0/4 mA and 20 mA current value. |

*Visibility depends on order options or device settings*
The flow components outside the scaled measuring range are taken into account for signal output as follows:

- Both values are defined such that they are not equal to zero flow e.g.:
  - 0/4 mA current value = \(-5 \text{ m}^3/\text{h}\)
  - 20 mA current value = \(10 \text{ m}^3/\text{h}\)
- If the effective flow exceeds or falls below this measuring range, the ΔS441 Current output 1 diagnostic message is displayed.

*Forward/Reverse flow* option

The current output signal is independent of the direction of flow (absolute amount of the measured variable). The values for the 0/4 mA value parameter (→ Δ S441) and 20 mA value parameter (→ Δ 86) must have the same sign.

- The value for the 20 mA value parameter (→ Δ 86) (e.g. reverse flow) corresponds to the mirrored value for the 20 mA value parameter (→ Δ 86) (e.g. forward flow).

*Reverse flow compensation* option

The Reverse flow compensation option is primarily used to compensate for abrupt reverse flow that can occur with positive displacement pumps as a result of wear or high viscosity. The reverse flow is recorded in a buffer memory and offset against the next forward flow.

If buffering cannot be processed within approx. 60 s, the ΔS441 Current output 1 diagnostic message is displayed.

In the event of prolonged and undesired reverse flow, flow values can accumulate in the buffer memory. Due to the configuration of the current output, these values are not factored in, however, i.e. there is no compensation for the reverse flow.

If this option is set, the measuring device does not smoothen the flow signal. The flow signal is not attenuated.

Examples of how the current output behaves

**Example 1**

Defined measuring range: lower range value and upper range value with the same sign
2 Measuring range

- **I** (Current)
- **Q** (Flow)
- 1 Lower range value (value assigned to 0/4 mA current)
- 2 Upper range value (value assigned to 20 mA current)

With the following flow response:

3 Flow response

- **Q** (Flow)
- **t** (Time)

With **Forward flow** option

The current output signal is proportional to the process variable assigned. The flow components outside the scaled measuring range are not taken into account for signal output.

With **Forward/Reverse flow** option

The current output signal is independent of the direction of flow.

With **Reverse flow compensation** option
Flow components outside of the measuring range are buffered, balanced and output after a maximum delay of 60 s.

\[ I = A \]

- **I**: Current
- **t**: Time
- **S**: Flow components saved
- **A**: Balancing of saved flow components

**Example 2**

Defined measuring range: lower range value and upper range value with **different** signs

\[ I \] 4 Measuring range

- **I**: Current
- **Q**: Flow
  1. Lower range value (value assigned to 0/4 mA current)
  2. Upper range value (value assigned to 20 mA current)

With flow a (−) outside, b (− −) inside the measuring range

**With Forward flow option**

- a (−): The flow components outside the scaled measuring range cannot be taken into account for signal output. The \( \Delta S441 \) **Current output** 1 diagnostic message is output.
- b (− −): The current output signal is proportional to the process variable assigned.
With **Forward/Reverse flow** option

This option cannot be selected here since the values for the 0/4 mA value parameter (→ 84) and 20 mA value parameter (→ 86) have different algebraic signs.

With **Reverse flow compensation** option

Flow components outside of the measuring range are buffered, balanced and output after a maximum delay of 60 s.

---

### Damping current output

**Navigation**

Expert → Output → Curr.output 1 → Damp.curr.outp (0363–1)

**Prerequisite**

A process variable is selected in the **Assign current output** parameter (→ 82) and one of the following options is selected in the **Current span** parameter (→ 83):

- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

**Description**

Use this function to enter a time constant for the reaction time of the current output signal to fluctuations in the measured value caused by process conditions.

**User entry**

0.0 to 999.9 s

**Factory setting**

1.0 s
Additional information

*User entry*

Use this function to enter a time constant (PT1 element \(^3\)) for current output damping:

- If a low time constant is entered, the current output reacts particularly quickly to fluctuating measured variables.
- On the other hand, the current output reacts more slowly if a high time constant is entered.

Damping is switched off if 0 is entered (factory setting).

Failure behavior current output

**Navigation**

Expert → Output → Curr.output 1 → Fail.behav.out (0364–1)

**Prerequisite**

A process variable is selected in the Assign current output parameter (→ 82) and one of the following options is selected in the Current span parameter (→ 83):

- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

**Description**

Use this function to select the value of the current output in the event of a device alarm.

**Selection**

- Min.
- Max.
- Last valid value
- Actual value
- Fixed value

**Factory setting**

Max.

---

\(^3\) proportional transmission behavior with first order delay
Additional information

Description

This setting does not affect the failsafe mode of other outputs and totalizers. This is specified in separate parameters.

'Min.' option

The current output adopts the value of the lower level for signal on alarm.

- The signal on alarm level is defined via the **Current span** parameter (→ 83).

'Max.' option

The current output adopts the value of the upper level for signal on alarm.

- The signal on alarm level is defined via the **Current span** parameter (→ 83).

'Last valid value' option

The current output adopts the last measured value that was valid before the device alarm occurred.

'Actual value' option

The current output adopts the measured value on the basis of the current flow measurement; the device alarm is ignored.

'Defined value' option

The current output adopts a defined measured value.

- The measured value is defined via the **Failure current** parameter (→ 93).

---

**Failure current**

- **Navigation**

  Expert → Output → Curr.output 1 → Fail. current (0352–1)

- **Prerequisite**

  The **Defined value** option is selected in the **Failure mode** parameter (→ 92).

- **Description**

  Use this function to enter a fixed value that the current output adopts in the event of a device alarm.

- **User entry**

  0 to 22.5 mA

- **Factory setting**

  22.5 mA

---

**Output current 1**

- **Navigation**

  Expert → Output → Curr.output 1 → Output curr. 1 (0361–1)

- **Description**

  Displays the current value currently calculated for the current output.

- **User interface**

  0 to 22.5 mA
Description of Device Parameters

Proline Promag 400 Modbus RS485

Measured current 1

Navigation

Expert → Output → Curr.output 1 → Measur. curr. 1 (0366–1)

Description

Displays the actual measured value of the output current.

User interface

0 to 30 mA

3.3.2 "Pulse/frequency/switch output 1 to n" submenu

Navigation

Expert → Output → PFS output 1 to n

Operating mode (0469–1 to n) → 95
Assign pulse output 1 to n (0460–1 to n) → 97
Pulse scaling (0455–1 to n) → 97
Pulse width (0452–1 to n) → 98
Measuring mode (0457–1 to n) → 99
Failure mode (0480–1 to n) → 99
Pulse output 1 to n (0456–1 to n) → 100
Assign frequency output (0478–1 to n) → 101
Minimum frequency value (0453–1 to n) → 101
Maximum frequency value (0454–1 to n) → 101
Measuring value at minimum frequency (0476–1 to n) → 102
Measuring value at maximum frequency (0475–1 to n) → 102
Measuring mode (0479–1 to n) → 103
Damping output 1 to n (0477–1 to n) → 103
### Operating mode

**Navigation**

عكس 👈 Expert ➔ Output ➔ PFS output 1 to n ➔ Operating mode (0469–1 to n)

**Description**

Use this function to select the operating mode of the output as a pulse, frequency or switch output.

**Selection**

- Pulse *
- Frequency *
- Switch *

**Factory setting**

Pulse

* Visibility depends on order options or device settings
**Additional information**

"Pulse" option

Quantity-dependent pulse with configurable pulse width
- Whenever a specific mass or volume is reached (pulse value), a pulse is output, the duration of which was set previously (pulse width).
- The pulses are never shorter than the set duration.

Example
- Flow approx. 100 g/s
- Pulse value 0.1 g
- Pulse width 0.05 ms
- Pulse rate 1000 Impuls/s

"Frequency" option

Flow-dependent frequency output with 1:1 on/off ratio
An output frequency is output that is proportional to the value of a process variable, such as mass flow, volume flow, flow velocity, conductivity or electronic temperature.

Example
- Flow approx. 100 g/s
- Max. frequency 10 kHz
- Flow at max. frequency 1000 g/s
- Output frequency approx. 1000 Hz

"Switch" option

Contact for displaying a condition (e.g. alarm or warning if a limit value is reached)

Example
Alarm response without alarm
Assign pulse output 1 to n

**Navigation**

Expert → Output → PFS output 1 to n → Assign pulse 1 to n (0460–1 to n)

**Prerequisite**

The Pulse option is selected in the Operating mode parameter (→ 95).

**Description**

Use this function to select the process variable for the pulse output.

**Selection**

- Off
- Volume flow
- Mass flow
- Corrected volume flow

**Factory setting**

Off

Pulse scaling

**Navigation**

Expert → Output → PFS output 1 to n → Pulse scaling (0455–1 to n)

**Prerequisite**

The Pulse option is selected in the Operating mode parameter (→ 95) and a process variable is selected in the Assign pulse output parameter (→ 97).

**Description**

Use this function to enter the value for the measured value that a pulse is equivalent to.

**User entry**

Positive floating point number

**Factory setting**

Depends on country and nominal diameter
Additional information

User entry

Weighting of the pulse output with a quantity.
The lower the pulse value, the

- better the resolution.
- the higher the frequency of the pulse response.

Pulse width

Navigation

Expert → Output → PFS output 1 to n → Pulse width (0452–1 to n)

Prerequisite

The Pulse option is selected in the Operating mode parameter (→ 95) and a process variable is selected in the Assign pulse output parameter (→ 97).

Description

Use this function to enter the duration of the output pulse.

User entry

0.05 to 2000 ms

Factory setting

100 ms

Additional information

Description

- Define how long a pulse is (duration).
- The maximum pulse rate is defined by \( f_{\text{max}} = \frac{1}{2 \times \text{pulse width}} \).
- The interval between two pulses lasts at least as long as the set pulse width.
- The maximum flow is defined by \( Q_{\text{max}} = f_{\text{max}} \times \text{pulse value} \).
- If the flow exceeds these limit values, the measuring device displays the 443 Pulse output 1 to n diagnostic message.

Example

- Pulse value: 0.1 g
- Pulse width: 0.1 ms
- \( f_{\text{max}} = \frac{1}{2 \times 0.1 \text{ ms}} = 5 \text{ kHz} \)
- \( Q_{\text{max}} = 5 \text{ kHz} \times 0.1 \text{ g} = 0.5 \text{ kg/s} \)
Measuring mode

Navigation

Expert → Output → PFS output 1 to n → Measuring mode (0457–1 to n)

Prerequisite

In the Operating mode parameter (→ 95), the Pulse option is selected, and one of the following options is selected in the Assign pulse output parameter (→ 97):
• Mass flow
• Volume flow

Description

Use this function to select the measuring mode for the pulse output.

Selection

• Forward flow
• Forward/Reverse flow
• Reverse flow
• Reverse flow compensation

Factory setting

Forward flow

Additional information

Selection

• Forward flow
  Positive flow is output, negative flow is not output.
• Forward/Reverse flow
  Positive and negative flow are output (absolute value), but a distinction is not made between positive and negative flow.
• Reverse flow
  Negative flow is output, positive flow is not output.
• Reverse flow compensation
  The flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 s.

Failure mode

Navigation

Expert → Output → PFS output 1 to n → Failure mode (0480–1 to n)

Prerequisite

The Pulse option is selected in the Operating mode parameter (→ 95) and a process variable is selected in the Assign pulse output parameter (→ 97).

Description

Use this function to select the failure mode of the pulse output in the event of a device alarm.

Selection

• Actual value
• No pulses

Factory setting

No pulses
Additional information  Description

The dictates of safety render it advisable to ensure that the pulse output shows a predefined behavior in the event of a device alarm.

Selection
- Actual value
  In the event of a device alarm, the pulse output continues on the basis of the current flow measurement. The fault is ignored.
- No pulses
  In the event of a device alarm, the pulse output is 'switched off'.

NOTICE! A device alarm is a measuring device error that must be taken seriously. It can affect the measurement quality such that the quality can no longer be guaranteed. The Actual value option is only recommended if it can be guaranteed that all possible alarm conditions will not affect the measurement quality.

Pulse output 1 to n

Navigation  ➔ ➔  Expert → Output → PFS output 1 to n → Pulse output 1 to n (0456–1 to n)

Prerequisite
The Pulse option is selected in the Operating mode parameter (→ 95) parameter.

Description
Displays the pulse frequency currently output.

User interface
Positive floating-point number

Additional information  Description
- The pulse output is an open collector output.
- This is configured at the factory in such a way that the transistor is conductive for the duration of the pulse (NO contact) and is safety-oriented.
- The Value per pulse parameter (→ 97) and Pulse width parameter (→ 98) can be used to define the value (i.e. the measured value amount that corresponds to a pulse) and the duration of the pulse.

The output behavior can be reversed via the Invert output signal parameter (→ 112) i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of a device alarm (Failure mode parameter (→ 99)) can be configured.
Assign frequency output

**Navigation**

> Expert → Output → PFS output 1 to n → Assign freq. (0478–1 to n)

**Prerequisite**

The **Frequency** option is selected in the **Operating mode** parameter (→ 95).

**Description**

Use this function to select the process variable for the frequency output.

**Selection**

- Off
- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Conductivity
- Corrected conductivity
- Temperature
- Electronics temperature
- Noise
- Coil current shot time
- Reference electrode potential against PE
- Build-up index
- Test point 1
- Test point 2
- Test point 3

**Factory setting**

Off

Minimum frequency value

**Navigation**

> Expert → Output → PFS output 1 to n → Min. freq. value (0453–1 to n)

**Prerequisite**

The **Frequency** option is selected in the **Operating mode** parameter (→ 95) and a process variable is selected in the **Assign frequency output** parameter (→ 101).

**Description**

Use this function to enter the minimum frequency.

**User entry**

0.0 to 10000.0 Hz

**Factory setting**

0.0 Hz

Maximum frequency value

**Navigation**

> Expert → Output → PFS output 1 to n → Max. freq. value (0454–1 to n)

**Prerequisite**

The **Frequency** option is selected in the **Operating mode** parameter (→ 95) and a process variable is selected in the **Assign frequency output** parameter (→ 101).

* Visibility depends on order options or device settings

Endress+Hauser
Description of Device Parameters

Proline Promag 400 Modbus RS485

Description
Use this function to enter the end value frequency.

User entry
0.0 to 10000.0 Hz

Factory setting
10000.0 Hz

Measuring value at minimum frequency

Navigation
Expert → Output → PFS output 1 to n → Val. at min.freq (0476–1 to n)

Prerequisite
The Frequency option is selected in the Operating mode parameter (→ 95) and a process variable is selected in the Assign frequency output parameter (→ 101).

Description
Use this function to enter the measured value for the start value frequency.

User entry
Signed floating-point number

Factory setting
Depends on country and nominal diameter

Additional information
Dependency
The entry depends on the process variable selected in the Assign frequency output parameter (→ 101).

Measuring value at maximum frequency

Navigation
Expert → Output → PFS output 1 to n → Val. at max.freq (0475–1 to n)

Prerequisite
The Frequency option is selected in the Operating mode parameter (→ 95) and a process variable is selected in the Assign frequency output parameter (→ 101).

Description
Use this function to enter the measured value for the end value frequency.

User entry
Signed floating-point number

Factory setting
Depends on country and nominal diameter

Additional information
Description
Use this function to enter the maximum measured value at the maximum frequency. The selected process variable is output as a proportional frequency.

Dependency
The entry depends on the process variable selected in the Assign frequency output parameter (→ 101).
### Measuring mode

**Navigation**

Expert → Output → PFS output 1 to n → Measuring mode (0479–1 to n)

**Prerequisite**

In the **Operating mode** parameter (→ 95), the **Frequency** option is selected, and one of the following options is selected in the **Assign frequency output** parameter (→ 101):

- Volume flow
- Mass flow
- Flow velocity
- Conductivity
- Electronics temperature

**Description**

Use this function to select the measuring mode for the frequency output.

**Selection**

- Forward flow
- Forward/Reverse flow
- Reverse flow compensation

**Factory setting**

Forward flow

---

### Damping output 1 to n

**Navigation**

Expert → Output → PFS output 1 to n → Damping out. 1 to n (0477–1 to n)

**Prerequisite**

In the **Operating mode** parameter (→ 95), the **Frequency** option is selected, and one of the following options is selected in the **Assign frequency output** parameter (→ 101):

- Volume flow
- Mass flow
- Flow velocity
- Conductivity
- Electronics temperature

**Description**

Use this function to enter a time constant for the reaction time of the output signal to fluctuations in the measured value.

**User entry**

0 to 999.9 s

**Factory setting**

0.0 s

**Additional information**

*Use this function to enter a time constant (PT1 element) for frequency output damping:
- If a low time constant is entered, the current output reacts particularly quickly to fluctuating measured variables.
- On the other hand, the current output reacts more slowly if a high time constant is entered.

Damping is switched off if 0 is entered (factory setting).

---

* Visibility depends on order options or device settings

* Proportional transmission behavior with first order delay
The frequency output is subject to separate damping that is independent of all preceding time constants.

### Response time

**Navigation**

Expert → Output → PFS output 1 to n → Response time (0491–1 to n)

**Prerequisite**

In the Operating mode parameter (→ 95), the Frequency option is selected, and one of the following options is selected in the Assign frequency output parameter (→ 101):
- Volume flow
- Mass flow
- Flow velocity
- Conductivity
- Electronics temperature

**Description**

Displays the response time. This specifies how quickly the pulse/frequency/switch output reaches the measured value change of 63% of 100% of the measured value change.

**User interface**

Positive floating-point number

**Additional information**

*Description*

The response time is made up of the time specified for the following dampings:
- Damping of pulse/frequency/switch output (→ 91)
- Depending on the measured variable assigned to the output.

### Failure mode

**Navigation**

Expert → Output → PFS output 1 to n → Failure mode (0451–1 to n)

**Prerequisite**

The Frequency option is selected in the Operating mode parameter (→ 95) and a process variable is selected in the Assign frequency output parameter (→ 101).

**Description**

Use this function to select the failure mode of the frequency output in the event of a device alarm.

**Selection**

- Actual value
- Defined value
- 0 Hz

**Factory setting**

0 Hz

*Visibility depends on order options or device settings*
Additional information  

**Selection**

- **Actual value**
  In the event of a device alarm, the frequency output continues on the basis of the current flow measurement. The device alarm is ignored.
- **Defined value**
  In the event of a device alarm, the frequency output continues on the basis of a predefined value. The Failure frequency (→ 105) replaces the current measured value, making it possible to bypass the device alarm. The actual measurement is switched off for the duration of the device alarm.
- **0 Hz**
  In the event of a device alarm, the frequency output is "switched off".

**NOTICE!** A device alarm is a measuring device error that must be taken seriously. It can affect the measurement quality such that the quality can no longer be guaranteed. The **Actual value** option is only recommended if it can be guaranteed that all possible alarm conditions will not affect the measurement quality.

### Failure frequency

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Output → PFS output 1 to n → Failure freq. (0474–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>The <strong>Frequency</strong> option is selected in the <strong>Operating mode</strong> parameter (→ 95) and a process variable is selected in the <strong>Assign frequency output</strong> parameter (→ 101).</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to enter the value for the frequency output in the event of a device alarm in order to bypass the alarm.</td>
</tr>
<tr>
<td>User entry</td>
<td>0.0 to 12 500.0 Hz</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0.0 Hz</td>
</tr>
</tbody>
</table>

### Output frequency 1 to n

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Output → PFS output 1 to n → Output freq. 1 to n (0471–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>In the <strong>Operating mode</strong> parameter (→ 95), the <strong>Frequency</strong> option is selected.</td>
</tr>
<tr>
<td>Description</td>
<td>Displays the actual value of the output frequency which is currently measured.</td>
</tr>
<tr>
<td>User interface</td>
<td>0.0 to 12 500.0 Hz</td>
</tr>
</tbody>
</table>

### Switch output function

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Output → PFS output 1 to n → Switch out funct (0481–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>The <strong>Switch</strong> option is selected in the <strong>Operating mode</strong> parameter (→ 95) parameter.</td>
</tr>
</tbody>
</table>
### Description
Use this function to select a function for the switch output.

### Selection
- Off
- On
- Diagnostic behavior
- Limit
- Flow direction check
- Status

#### Factory setting
Off

#### Additional information
**Selection**
- Off
  The switch output is permanently switched off (open, non-conductive).
- On
  The switch output is permanently switched on (closed, conductive).
- Diagnostic behavior
  Indicates if the diagnostic event is present or not. Is used to output diagnostic information and to react to it appropriately at the system level.
- Limit
  Indicates if a specified limit value has been reached for the process variable. Is used to output diagnostic information relating to the process and to react to it appropriately at the system level.
- Flow direction check
  Indicates the flow direction (forward or reverse flow).
- Status
  Indicates the device status depending on whether empty pipe detection or low flow cut off is selected.

### Assign diagnostic behavior

#### Navigation
Expert → Output → PFS output 1 to n → Assign diag. beh (0482–1 to n)

#### Prerequisite
- In the Operating mode parameter (→ 95), the Switch option is selected.
- In the Switch output function parameter (→ 105), the Diagnostic behavior option is selected.

#### Description
Use this function to select the diagnostic event category that is displayed for the switch output.

#### Selection
- Alarm
- Alarm or warning
- Warning

#### Factory setting
Alarm
Additional information

Description

If no diagnostic event is pending, the switch output is closed and conductive.

Selection

- Alarm
  The switch output signals only diagnostic events in the alarm category.
- Alarm or warning
  The switch output signals diagnostic events in the alarm and warning category.
- Warning
  The switch output signals only diagnostic events in the warning category.

Assign limit

Navigation

Expert → Output → PFS output 1 to n → Assign limit (0483–1 to n)

Prerequisite

- The Switch option is selected in the Operating mode parameter (→ 95).
- The Limit option is selected in the Switch output function parameter (→ 105).

Description

Use this function to select a process variable for the limit function.

Selection

- Off
- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Conductivity
- Corrected conductivity
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Temperature
- Electronics temperature

Factory setting

Volume flow

Additional information

Description

Behavior of status output when Switch-on value > Switch-off value:

- Process variable > Switch-on value: transistor is conductive
- Process variable < Switch-off value: transistor is non-conductive

* Visibility depends on order options or device settings
1. **Switch-on value**
2. **Switch-off value**
3. **Conductive**
4. **Non-conductive**
A. **Process variable**
B. **Status output**

Behavior of status output when Switch-on value < Switch-off value:
- Process variable < Switch-on value: transistor is conductive
- Process variable > Switch-off value: transistor is non-conductive

Behavior of status output when Switch-on value = Switch-off value:
- Process variable > Switch-on value: transistor is conductive
- Process variable < Switch-off value: transistor is non-conductive
### Switch-on value

**Navigation**

Expert → Output → PFS output 1 to n → Switch-on value (0466–1 to n)

**Prerequisite**

- The **Switch** option is selected in the **Operating mode** parameter (→ 95).
- The **Limit** option is selected in the **Switch output function** parameter (→ 105).

**Description**

Use this function to enter the measured value for the switch-on point.

**User entry**

Signed floating-point number

**Factory setting**

Country-specific:
- 0 l/h
- 0 gal/min (us)

**Additional information**

**Description**

Use this function to enter the limit value for the switch-on value (process variable > switch-on value = closed, conductive).

When using a hysteresis: Switch-on value > Switch-off value.

**Dependency**

The unit depends on the process variable selected in the **Assign limit** parameter (→ 107).

---

### Switch-off value

**Navigation**

Expert → Output → PFS output 1 to n → Switch-off value (0464–1 to n)

**Prerequisite**

- The **Switch** option is selected in the **Operating mode** parameter (→ 95).
- The **Limit** option is selected in the **Switch output function** parameter (→ 105).

**Description**

Use this function to enter the measured value for the switch-off point.

**User entry**

Signed floating-point number

**Factory setting**

Country-specific:
- 0 l/h
- 0 gal/min (us)

**Additional information**

**Description**

Use this function to enter the limit value for the switch-off value (process variable < switch-off value = open, non-conductive).

When using a hysteresis: Switch-on value > Switch-off value.

**Dependency**

The unit depends on the process variable selected in the **Assign limit** parameter (→ 107).
Assign flow direction check

**Navigation**

Expert → Output → PFS output 1 to n → Assign dir.check (0484–1 to n)

**Prerequisite**

- The **Switch** option is selected in the **Operating mode** parameter (→ 95).
- The **Flow direction check** option is selected in the **Switch output function** parameter (→ 105).

**Description**

Use this function to select a process variable for monitoring the flow direction.

**Selection**

- Off
- Volume flow
- Mass flow
- Corrected volume flow

**Factory setting**

Volume flow

Assign status

**Navigation**

Expert → Output → PFS output 1 to n → Assign status (0485–1 to n)

**Prerequisite**

- The **Switch** option is selected in the **Operating mode** parameter (→ 95).
- The **Status** option is selected in the **Switch output function** parameter (→ 105).

**Description**

Use this function to select a device status for the switch output.

**Selection**

- Empty pipe detection
- Low flow cut off
- Build-up index

**Factory setting**

Empty pipe detection

**Additional information**

*Options*

If empty pipe detection or low flow cut off are enabled, the output is conductive. Otherwise, the switch output is non-conductive.

Switch-on delay

**Navigation**

Expert → Output → PFS output 1 to n → Switch-on delay (0467–1 to n)

**Prerequisite**

- The **Switch** option is selected in the **Operating mode** parameter (→ 95).
- The **Limit** option is selected in the **Switch output function** parameter (→ 105).

**Description**

Use this function to enter a delay time for switching on the switch output.

**User entry**

0.0 to 100.0 s

* Visibility depends on order options or device settings
Factory setting

**Switch-off delay**

**Navigation**

Expert → Output → PFS output 1 to n → Switch-off delay (0465–1 to n)

**Prerequisite**

- The Switch option is selected in the Operating mode parameter (→ 95).
- The Limit option is selected in the Switch output function parameter (→ 105).

**Description**

Use this function to enter a delay time for switching off the switch output.

**User entry**

0.0 to 100.0 s

**Factory setting**

0.0 s

---

Failure mode

**Navigation**

Expert → Output → PFS output 1 to n → Failure mode (0486–1 to n)

**Description**

Use this function to select a failsafe mode for the switch output in the event of a device alarm.

**Selection**

- Actual status
- Open
- Closed

**Factory setting**

Open

**Additional information**

*Options*

- Actual status
  In the event of a device alarm, faults are ignored and the current behavior of the input value is output by the switch output. The Actual status option behaves in the same way as the current input value.
- Open
  In the event of a device alarm, the switch output's transistor is set to **non-conductive**.
- Closed
  In the event of a device alarm, the switch output's transistor is set to **conductive**.

---

Switch state 1 to n

**Navigation**

Expert → Output → PFS output 1 to n → Switch state 1 to n (0461–1 to n)

**Prerequisite**

The Switch option is selected in the Operating mode parameter (→ 95).

**Description**

Displays the current switch status of the status output.
User interface
- Open
- Closed

Additional information
User interface
- Open
  The switch output is not conductive.
- Closed
  The switch output is conductive.

Invert output signal

Navigation
Expert → Output → PFS output 1 to n → Invert outp.sig. (0470–1 to n)

Description
Use this function to select whether to invert the output signal.

Selection
- No
- Yes

Factory setting
No

Additional information
Selection
No option (passive - negative)

Yes option (passive - positive)

3.4 "Communication" submenu

Navigation
Expert → Communication

[Diagram of menu structure]

- Modbus configuration → 113
- Modbus information → 117
3.4.1 "Modbus configuration" submenu

**Navigation**  
Expert → Communication → Modbus config.

**Bus address**

**Navigation**  
Expert → Communication → Modbus config. → Bus address (7112)

**Description**  
For entering the device address.

**User entry**  
1 to 247

**Factory setting**  
247

**Baudrate**

**Navigation**  
Expert → Communication → Modbus config. → Baudrate (7111)

**Description**  
Use this function to select a transmission rate.
Description of Device Parameters

Proline Promag 400 Modbus RS485

Selection

- 1200 BAUD
- 2400 BAUD
- 4800 BAUD
- 9600 BAUD
- 19200 BAUD
- 38400 BAUD
- 57600 BAUD
- 115200 BAUD

Factory setting

19200 BAUD

Data transfer mode

Navigation

Expert → Communication → Modbus config. → Data trans. mode (7115)

Description

Use this function to select the data transmission mode.

Selection

- ASCII
- RTU

Factory setting

RTU

Additional information

Options

- ASCII
  Transmission of data in the form of readable ASCII characters. Error protection via LRC.
- RTU
  Transmission of data in binary form. Error protection via CRC16.

Parity

Navigation

Expert → Communication → Modbus config. → Parity (7122)

Description

Use this function to select the parity bit.

Selection

- Odd
- Even
- None / 1 stop bit
- None / 2 stop bits

Factory setting

Even

Additional information

Options

Picklist ASCII option:

- 0 = Even option
- 1 = Odd option
Picklist RTU option:
- 0 = Even option
- 1 = Odd option
- 2 = None / 1 stop bit option
- 3 = None / 2 stop bits option

Navigation

Expert → Communication → Modbus config. → Byte order (7113)

Description

Use this function to select the sequence in which the bytes are transmitted. The transmission sequence must be coordinated with the Modbus master.

Selection

- 0-1-2-3
- 3-2-1-0
- 1-0-3-2
- 2-3-0-1

Factory setting

1-0-3-2

Additional information

Description

The byte sequence is not standardized by the Modbus protocol. However, if the host system and the measuring device do not use the same byte sequence, correct data exchange is not possible.

Changing the byte sequence in the host system often requires a extensive knowledge and significant programming efforts. Endress+Hauser introduced the Byte order parameter (→ 115) for this reason.

This makes it possible to use the standard settings of the host system and change the byte sequence on the measuring device by trial and error. If correct data exchange cannot be achieved by changing the byte sequence, the settings for the byte sequence of the host system must be adapted accordingly.

Byte transmission sequence

Byte addressing, i.e. the transmission sequence of the bytes, is not specified in the Modbus specification. For this reason, it is important to coordinate or match the addressing method between the master and slave during commissioning. This can be configured in the measuring device using the Byte order parameter (→ 115).

The bytes are transmitted depending on the selection in the Byte order parameter (→ 115):

<table>
<thead>
<tr>
<th>Options</th>
<th>Sequence</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 0 – 3 – 2</td>
<td>Byte 1</td>
<td>Byte 0</td>
<td>Byte 3</td>
<td>Byte 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(MMMMMMMM)</td>
<td>(MMMMMMMM)</td>
<td>(SEEEEEEE)</td>
<td>(EMMMMMMMM)</td>
<td></td>
</tr>
<tr>
<td>0 – 1 – 2 – 3</td>
<td>Byte 0</td>
<td>Byte 1</td>
<td>Byte 2</td>
<td>Byte 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(MMMMMMMM)</td>
<td>(MMMMMMMM)</td>
<td>(EMMMMMMMM)</td>
<td>(SEEEEEEE)</td>
<td></td>
</tr>
<tr>
<td>2 – 3 – 0 – 1</td>
<td>Byte 2</td>
<td>Byte 3</td>
<td>Byte 0</td>
<td>Byte 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(EMMMMMMMM)</td>
<td>(SEEEEEEE)</td>
<td>(MMMMMMMM)</td>
<td>(MMMMMMMM)</td>
<td></td>
</tr>
</tbody>
</table>
### INTEGER

<table>
<thead>
<tr>
<th>Options</th>
<th>Sequence Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 0 - 3 - 2 *</td>
<td>Byte 1 (MSB)</td>
</tr>
<tr>
<td>3 - 2 - 1 - 0</td>
<td>Byte 0 (LSB)</td>
</tr>
</tbody>
</table>

* = factory setting, MSB = most significant byte, LSB = least significant byte

### STRING

Presentation taking the example of a device parameter with a data length of 18 bytes.

<table>
<thead>
<tr>
<th>Options</th>
<th>Sequence Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 0 - 3 - 2 *</td>
<td>Byte 17 (MSB) Byte 16 (MSB) Byte 16 (LSB) Byte 17 (LSB) Byte 1 (MSB) Byte 0 (LSB)</td>
</tr>
<tr>
<td>3 - 2 - 1 - 0</td>
<td>Byte 1 (LSB) Byte 0 (LSB) Byte 1 (MSB)</td>
</tr>
</tbody>
</table>

* = factory setting, MSB = most significant byte, LSB = least significant byte

---

**Telegram delay**

**Navigation**

Expert → Communication → Modbus config. → Telegram delay (7146)

**Description**

Use this function to enter a delay time after which the measuring device replies to the request telegram of the Modbus master. This allows communication to be adapted to slow Modbus RS485 masters.

**User entry**

0 to 100 ms

**Factory setting**

6 ms

**Failure mode**

**Navigation**

Expert → Communication → Modbus config. → Failure mode (7116)

**Description**

Use this function to select the measured value output in the event of a diagnostic message via Modbus communication.

**Selection**

- NaN value
- Last valid value

**Factory setting**

NaN value
Additional information

Options

- NaN value
  The device outputs the NaN value 5).
- Last valid value
  The device outputs the last valid measured value before the fault occurred.

* This effect of this parameter depends on the option selected in the Assign diagnostic behavior parameter.

Fieldbus writing access

Navigation

Expert → Communication → Modbus config. → Fieldb.writ.acc. (7156)

Description

Use this function to restrict access to the measuring device via fieldbus (Modbus protocol).

Selection

- Read + write
- Read only

Factory setting

Read + write

Additional information

Description

If read and/or write protection is enabled, the parameter can only be controlled and reset via local operation. Access is no longer possible via operating tools.

* This does not affect cyclic measured value transmission to the higher-order system, which is always guaranteed.

Selection

- Read + write
  The parameters are read and write parameters.
- Read only
  The parameters are read only parameters.

3.4.2 "Modbus information" submenu

Navigation

Expert → Communication → Modbus info

<table>
<thead>
<tr>
<th>Modbus information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device ID (7153)</td>
</tr>
<tr>
<td>Device revision (7154)</td>
</tr>
</tbody>
</table>

5) Not a Number
### Device ID

**Navigation**

Expert → Communication → Modbus info → Device ID (7153)

**Description**

Displays the device ID for identifying the measuring device.

**User interface**

4-digit hexadecimal number

---

### Device revision

**Navigation**

Expert → Communication → Modbus info → Device revision (7154)

**Description**

Displays the device revision.

**User interface**

4-digit hexadecimal number

---

### "Modbus data map" submenu

**Navigation**

Expert → Communication → Modbus data map

---

**Scan list register 0 to 15**

**Navigation**

Expert → Communication → Modbus data map → Scan list reg.0 to 15 (7114)

**Description**

Use this function to enter the scan list register. By entering the register address (1-based), up to 16 device parameters can be grouped by assigning them to the scan list registers 0 to 15. The data of the device parameters assigned here are read out via the register addresses 5051 to 5081.

**User entry**

1 to 65535

**Factory setting**

1
3.4.4 "Web server" submenu

Navigation 
Expert → Communication → Web server

Web server language

Description
Use this function to select the Web server language setting.

Selection
- English
- Deutsch
- Français
- Español
- Italiano
- Nederlands
- Portuguesa
- Polski
- русский язык (Russian)
- Svenska
- Türkçe
- 中文 (Chinese)
- 日本語 (Japanese)
- 한국어 (Korean)
- العربية (Arabic)*
- Bahasa Indonesia
- ภาษาไทย (Thai)*
- tiếng Việt (Vietnamese)
- čeština (Czech)

* Visibility depends on order options or device settings
**MAC address**

**Navigation**

Expert → Communication → Web server → MAC Address (7214)

**Description**

Displays the MAC address of the measuring device.

**User interface**

Unique 12-digit character string comprising letters and numbers

**Factory setting**

Each measuring device is given an individual address.

**Additional information**

*Example*

For the display format
00:07:05:10:01:5F

---

**DHCP client**

**Navigation**

Expert → Communication → Web server → DHCP client (7212)

**Description**

Use this function to activate and deactivate the DHCP client functionality.

**Selection**

- Off
- On

**Factory setting**

On

**Additional information**

*Effect*

If the DHCP client functionality of the web server is selected, the IP address (→ 120), Subnet mask (→ 121) and Default gateway (→ 121) are set automatically.

- Identification is via the MAC address of the measuring device.
- The IP address (→ 120) in the IP address parameter (→ 120) is ignored as long as the DHCP client parameter (→ 120) is active. This is also the case, in particular, if the DHCP server cannot be reached. The IP address (→ 120) in the parameter of the same name is only used if the DHCP client parameter (→ 120) is inactive.

---

**IP address**

**Navigation**

Expert → Communication → Web server → IP address (7209)

**Description**

Display or enter the IP address of the Web server integrated in the measuring device.

---

6) Media Access Control
### Subnet mask

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → Web server → Subnet mask (7211)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Display or enter the subnet mask.</td>
</tr>
<tr>
<td>User entry</td>
<td>4 octet: 0 to 255 (in the particular octet)</td>
</tr>
<tr>
<td>Factory setting</td>
<td>255.255.255.0</td>
</tr>
</tbody>
</table>

### Default gateway

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → Web server → Default gateway (7210)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Display or enter the Default gateway (→ 121).</td>
</tr>
<tr>
<td>User entry</td>
<td>4 octet: 0 to 255 (in the particular octet)</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0.0.0.0</td>
</tr>
</tbody>
</table>

### Web server functionality

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → Web server → Webserver funct. (7222)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to switch the Web server on and off.</td>
</tr>
</tbody>
</table>
| Selection  | • Off  
             • On                                           |
| Factory setting | On                                                           |
Additional information

Description

Once disabled, the Web server functionality can only be re-enabled via or the operating tool FieldCare.

Selection

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| Off    | • The web server is completely disabled.  
         • Port 80 is locked. |
| On     | • The complete functionality of the web server is available.  
         • JavaScript is used.  
         • The password is transferred in an encrypted state.  
         • Any change to the password is also transferred in an encrypted state. |

Login page

Navigation

Expert → Communication → Web server → Login page (7273)

Description

Use this function to select the format of the login page.

Selection

- Without header
- With header

Factory setting

With header

3.4.5  "WLAN settings" wizard

Navigation

Expert → Communication → WLAN settings

WLAN settings

<table>
<thead>
<tr>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLAN (2702)</td>
</tr>
<tr>
<td>WLAN mode (2717)</td>
</tr>
<tr>
<td>SSID name (2714)</td>
</tr>
<tr>
<td>Network security (2705)</td>
</tr>
<tr>
<td>Security identification (2718)</td>
</tr>
<tr>
<td>User name (2715)</td>
</tr>
<tr>
<td>WLAN password (2716)</td>
</tr>
<tr>
<td>WLAN IP address (2711)</td>
</tr>
</tbody>
</table>
**WLAN**

**Navigation**  
Expert → Communication → WLAN settings → WLAN (2702)

**Description**  
Use this function to enable and disable the WLAN connection.

**Selection**  
- Disable
- Enable

**Factory setting**  
Enable

**WLAN mode**

**Navigation**  
Expert → Communication → WLAN settings → WLAN mode (2717)

**Description**  
Use this function to select the WLAN mode.
**SSID name**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → WLAN settings → SSID name (2714)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>The client is activated.</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to enter the user-defined SSID name (max. 32 characters) of the WLAN network.</td>
</tr>
<tr>
<td>User entry</td>
<td>–</td>
</tr>
<tr>
<td>Factory setting</td>
<td>–</td>
</tr>
</tbody>
</table>

**Network security**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → WLAN settings → Network security (2705)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to select the type of security for the WLAN interface.</td>
</tr>
</tbody>
</table>
| Selection        | • Unsecured
|                  | • WPA2-PSK
|                  | • EAP-PEAP with MSCHAPv2 *
|                  | • EAP-PEAP MSCHAPv2 no server authentic.
|                  | • EAP-TLS* |
| Factory setting  | WPA2-PSK |
| Additional information | *Selection* |
|                   | • Unsecured
|                   | Access the WLAN connection without identification. |
|                   | • WPA2-PSK
|                   | Access the WLAN connection with a network key. |

**Security identification**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → WLAN settings → Sec. identific. (2718)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to select the security settings (download via the menu: Data Management &gt; Security &gt; Download WLAN).</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
User interface

- Trusted issuer certificate
- Device certificate
- Device private key

User name

Navigation  
Expert → Communication → WLAN settings → User name (2715)

Description  
Use this function to enter the username of the WLAN network.

User entry  
-

Factory setting  
-

WLAN password

Navigation  
Expert → Communication → WLAN settings → WLAN password (2716)

Description  
Use this function to enter the WLAN password for the WLAN network.

User entry  
-

Factory setting  
-

WLAN IP address

Navigation  
Expert → Communication → WLAN settings → WLAN IP address (2711)

Description  
Use this function to enter the IP address of the measuring device's WLAN connection.

User entry  
4 octet: 0 to 255 (in the particular octet)

Factory setting  
192.168.1.212

WLAN MAC address

Navigation  
Expert → Communication → WLAN settings → WLAN MAC address (2703)

Description  
Displays the MAC\(^7\) address of the measuring device.

User interface  
Unique 12-digit character string comprising letters and numbers

\(^7\) Media Access Control
**Factory setting**  
Each measuring device is given an individual address.

**Additional information**  
*Example*  
For the display format  
00:07:05:10:01:5F

---

**WLAN subnet mask**

**Navigation**  
Expert → Communication → WLAN settings → WLAN subnet mask (2709)

**Description**  
Use this function to enter the subnet mask.

**User entry**  
4 octet: 0 to 255 (in the particular octet)

**Factory setting**  
255.255.255.0

---

**WLAN passphrase**

**Navigation**  
Expert → Communication → WLAN settings → WLAN passphrase (2706)

**Prerequisite**  
The WPA2-PSK option is selected in the Security type parameter (→ 124).

**Description**  
Use this function to enter the network key.

**User entry**  
8 to 32-digit character string comprising numbers, letters and special characters (without spaces)

**Factory setting**  
Serial number of the measuring device (e.g. L100A802000)

---

**Assign SSID name**

**Navigation**  
Expert → Communication → WLAN settings → Assign SSID name (2708)

**Description**  
Use this function to select which name is used for the SSID.

**Selection**
- Device tag
- User-defined

**Factory setting**  
User-defined

---

8) Service Set Identifier
Additional information

Selection

- Device tag
  The device tag name is used as the SSID.
- User-defined
  A user-defined name is used as the SSID.

SSID name

Navigation

Expert → Communication → WLAN settings → SSID name (2707)

Prerequisite

- The User-defined option is selected in the Assign SSID name parameter (→ Desired)
- The WLAN access point option is selected in the WLAN mode parameter (→ Desired)

Description

Use this function to enter a user-defined SSID name.

User entry

Max. 32-digit character string comprising numbers, letters and special characters

Factory setting

2.4 GHz WLAN channel

Navigation

Expert → Communication → WLAN settings → WLAN channel (2704)

Description

Use this function to enter the 2.4 GHz WLAN channel.

User entry

1 to 11

Factory setting

6

Additional information

- It is only necessary to enter a 2.4 GHz WLAN channel if multiple WLAN devices are in use.
- If just one measuring device is in use, it is recommended to keep the factory setting.

Select antenna

Navigation

Expert → Communication → WLAN settings → Select antenna (2713)

Description

Use this function to select whether the external or internal antenna is used for reception.

Selection

- External antenna
- Internal antenna

Factory setting

Internal antenna
### Connection state

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → WLAN settings → Connection state (2722)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>The connection status is displayed.</td>
</tr>
</tbody>
</table>
| **User interface** | • Connected  
| | • Not connected |
| **Factory setting** | Not connected |

### Received signal strength

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → WLAN settings → Rec.sig.strength (2721)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Displays the signal strength received.</td>
</tr>
</tbody>
</table>
| **User interface** | • Low  
| | • Medium  
| | • High |
| **Factory setting** | High |

### Gateway IP address

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → WLAN settings → Gateway IP addr. (2719)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to enter the IP address of the gateway.</td>
</tr>
<tr>
<td><strong>User interface</strong></td>
<td>Character string comprising numbers, letters and special characters</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>192.168.1.212</td>
</tr>
</tbody>
</table>

### IP address domain name server

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → WLAN settings → IP address DNS (2720)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to enter the IP address of the domain name server.</td>
</tr>
<tr>
<td><strong>User interface</strong></td>
<td>Character string comprising numbers, letters and special characters</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>192.168.1.212</td>
</tr>
</tbody>
</table>
3.5 "Application" submenu

**Navigation**

Expert → Application

---

**Reset all totalizers**

**Navigation**

Expert → Application → Reset all totalizers (2806)

**Description**
Use this function to reset all totalizers to the value 0 and restart the totaling process. This deletes all the flow values previously totalized.

**Selection**
- Cancel
- Reset + totalize

**Factory setting**
Cancel

**Additional information**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancel</td>
<td>No action is executed and the user exits the parameter.</td>
</tr>
<tr>
<td>Reset + totalize</td>
<td>Resets all totalizers to 0 and restarts the totaling process.  This deletes all the flow values previously totalized.</td>
</tr>
</tbody>
</table>

---

3.5.1 "Totalizer 1 to n" submenu

**Navigation**

Expert → Application → Totalizer 1 to n

---

**Assign process variable (0914–1 to n)**

**Unit totalizer 1 to n (0915–1 to n)**

**Totalizer operation mode (0908–1 to n)**
Assign process variable

**Navigation**

Expert → Application → Totalizer 1 to n → Assign variable (0914–1 to n)

**Description**

Use this function to select a process variable for the Totalizer 1 to n.

**Selection**

- Off
- Volume flow
- Mass flow
- Corrected volume flow

**Factory setting**

Volume flow

**Additional information**

*Description*

If the option selected is changed, the device resets the totalizer to 0.

*Selection*

If the **Off** option is selected, only the **Assign process variable** parameter (→ 130) is still displayed in the **Totalizer 1 to n** submenu. All other parameters in the submenu are hidden.

Unit totalizer 1 to n

**Navigation**

Expert → Application → Totalizer 1 to n → Unit totalizer 1 to n (0915–1 to n)

**Prerequisite**

A process variable is selected in the **Assign process variable** parameter (→ 130) of the **Totalizer 1 to n** submenu.

**Description**

Use this function to select the process variable unit for the Totalizer 1 to n (→ 129).

**Selection**

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>g *</td>
<td>oz *</td>
</tr>
<tr>
<td>kg *</td>
<td>lb *</td>
</tr>
<tr>
<td>t *</td>
<td>STon *</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

or
**SI units**
- cm³*
- dm³*
- m³*
- ml*
- l*
- hl*
- MI Mega

**US units**
- af*
- ft³*
- Mft³*
- fl oz (us)*
- gal (us)*
- kcal (us)*
- Mgal (us)*
- bbl (us; liq.)*
- bbl (us; beer)*
- bbl (us; oil)*
- bbl (us; tank)*

**Imperial units**
- gal (imp)*
- Mgal (imp)*
- bbl (imp; beer)*
- bbl (imp; oil)*

* Visibility depends on order options or device settings

or

**SI units**
- Nl*
- Nhl*
- Nm³*
- Sl*
- Sm³*

**US units**
- Sft³*
- MMSft³*
- Sgal (us)*
- Sbbl (us; liq.)*
- Sbbl (us; oil)*

**Imperial units**
- Sgal (imp)*

* Visibility depends on order options or device settings

or

**Other units**
None*

* Visibility depends on order options or device settings

**Factory setting**
Country-specific:
- l
- gal (us)

**Additional information**

**Description**
The unit is selected separately for each totalizer. It is independent of the selection made in the **System units** submenu (→ 47).

**Selection**
The selection is dependent on the process variable selected in the **Assign process variable** parameter (→ 130).

---

**Totalizer operation mode**

**Navigation**
Expert → Application → Totalizer 1 to n → Operation mode (0908–1 to n)

**Prerequisite**
A process variable is selected in the **Assign process variable** parameter (→ 130) of the **Totalizer 1 to n** submenu.
**Description**

Use this function to select how the totalizer summates the flow.

**Selection**

- Net flow total
- Forward flow total
- Reverse flow total

**Factory setting**

Net flow total

**Additional information**

**Selection**

- Net flow total
  Flow values in the forward and reverse flow direction are totalized and balanced against one another. Net flow is registered in the flow direction.
- Forward flow total
  Only the flow in the forward flow direction is totalized.
- Reverse flow total
  Only the flow in the reverse flow direction is totalized (= reverse flow quantity).

---

**Control Totalizer 1 to n**

**Navigation**

Expert → Application → Totalizer 1 to n → Control Tot. 1 to n (0912–1 to n)

**Prerequisite**

A process variable is selected in the Assign process variable parameter (→ 130) of the Totalizer 1 to n submenu.

**Description**

Use this function to select the control of totalizer value 1-3.

**Selection**

- Totalize
- Reset + hold
- Preset + hold
- Reset + totalize
- Preset + totalize
- Hold

**Factory setting**

Totalize

**Additional information**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totalize</td>
<td>The totalizer is started or continues running.</td>
</tr>
<tr>
<td>Reset + hold</td>
<td>The totalizing process is stopped and the totalizer is reset to 0.</td>
</tr>
<tr>
<td>Preset + hold</td>
<td>The totalizing process is stopped and the totalizer is set to its defined start value from the Preset value parameter.</td>
</tr>
<tr>
<td>Reset + totalize</td>
<td>The totalizer is reset to 0 and the totalizing process is restarted.</td>
</tr>
<tr>
<td>Preset + totalize</td>
<td>The totalizer is set to the defined start value from the Preset value parameter and the totalizing process is restarted.</td>
</tr>
</tbody>
</table>
### Preset value 1 to n

**Navigation**

Expert → Application → Totalizer 1 to n → Preset value 1 to n (0913–1 to n)

**Prerequisite**

A process variable is selected in the Assign process variable parameter (→ 130) of the Totalizer 1 to n submenu.

**Description**

Use this function to enter a start value for the Totalizer 1 to n.

**User entry**

Signed floating-point number

**Factory setting**

0

**Additional information**

User entry

The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→ 130).

**Example**

This configuration is suitable for applications such as iterative filling processes with a fixed batch quantity.

### Failure mode

**Navigation**

Expert → Application → Totalizer 1 to n → Failure mode (0901–1 to n)

**Prerequisite**

A process variable is selected in the Assign process variable parameter (→ 130) of the Totalizer 1 to n submenu.

**Description**

Use this function to select how a totalizer behaves in the event of a device alarm.

**Selection**

- Stop
- Actual value
- Last valid value

**Factory setting**

Stop

**Additional information**

Description

This setting does not affect the failsafe mode of other totalizers and the outputs. This is specified in separate parameters.

**Selection**

- Stop
  The totalizer is stopped in the event of a device alarm.
- Actual value
  The totalizer continues to count based on the actual (current) measured value; the device alarm is ignored.
- Last valid value
  The totalizer continues to count based on the last valid measured value before the device alarm occurred.
3.5.2  "Custody transfer" submenu

Only available for Promag W.

For detailed information on the parameter descriptions for custody transfer measurement, see the Special Documentation for the device →  7

Navigation  
Expert → Application → Custody transfer

3.6  "Diagnostics" submenu

Navigation  
Expert → Diagnostics

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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual diagnostics                       →</td>
<td>135</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous diagnostics                      →</td>
<td>135</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating time from restart               →</td>
<td>136</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating time                            →</td>
<td>136</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnostic list                           →</td>
<td>137</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Custody transfer logbook                   →</td>
<td>143</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Device information                        →</td>
<td>143</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Main electronic module                    →</td>
<td>147</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor electronic module (ISEM)            →</td>
<td>148</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Display module                            →</td>
<td>149</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Data logging                              →</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Min/max values                             →</td>
<td>158</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Heartbeat Technology                       →</td>
<td>160</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Simulation                                →</td>
<td>160</td>
</tr>
</tbody>
</table>
Actual diagnostics

Navigation  
Expert → Diagnostics → Actual diagnos. (0691)

Prerequisite  
A diagnostic event has occurred.

Description  
Displays the current diagnostic message. If two or more messages occur simultaneously, the message with the highest priority is shown on the display.

User interface  
Symbol for diagnostic behavior, diagnostic code and short message.

Additional information  
Display

Additional pending diagnostic messages can be viewed in the Diagnostic list submenu (→  137).

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the key.

Example  
For the display format:  
F271 Main electronics failure

Timestamp

Navigation  
Expert → Diagnostics → Timestamp

Description  
Displays the operating time when the current diagnostic message occurred.

User interface  
Days (d), hours (h), minutes (m) and seconds (s)

Additional information  
Display

The diagnostic message can be viewed via the Actual diagnostics parameter (→  135).

Example  
For the display format:  
24d12h13m00s

Previous diagnostics

Navigation  
Expert → Diagnostics → Prev.diagnostics (0690)

Prerequisite  
Two diagnostic events have already occurred.

Description  
Displays the diagnostic message that occurred before the current message.

User interface  
Symbol for diagnostic behavior, diagnostic code and short message.
**Additional information**

*Display*

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the key.

*Example*

For the display format:

- **F271** Main electronics failure

---

**Timestamp**

**Navigation**

- Expert → Diagnostics → Timestamp

**Description**

Displays the operating time when the last diagnostic message before the current message occurred.

**User interface**

Days (d), hours (h), minutes (m) and seconds (s)

**Additional information**

*Display*

The diagnostic message can be viewed via the **Previous diagnostics** parameter (→ 135).

*Example*

For the display format:

- 24d12h13m00s

---

**Operating time from restart**

**Navigation**

- Expert → Diagnostics → Time fr. restart (0653)

**Description**

Use this function to display the time the device has been in operation since the last device restart.

**User interface**

Days (d), hours (h), minutes (m) and seconds (s)

---

**Operating time**

**Navigation**

- Expert → Diagnostics → Operating time (0652)

**Description**

Use this function to display the length of time the device has been in operation.

**User interface**

Days (d), hours (h), minutes (m) and seconds (s)
Additional information

User interface

The maximum number of days is 9999, which is equivalent to 27 years.

3.6.1 "Diagnostic list" submenu

Navigation

Expert → Diagnostics → Diagnostic list

<table>
<thead>
<tr>
<th>Diagnostic list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostics 1 (0692)</td>
</tr>
<tr>
<td>Diagnostics 2 (0693)</td>
</tr>
<tr>
<td>Diagnostics 3 (0694)</td>
</tr>
<tr>
<td>Diagnostics 4 (0695)</td>
</tr>
<tr>
<td>Diagnostics 5 (0696)</td>
</tr>
</tbody>
</table>

Diagnostics 1

Navigation

Expert → Diagnostics → Diagnostic list → Diagnostics 1 (0692)

Description

Displays the current diagnostics message with the highest priority.

User interface

Symbol for diagnostic behavior, diagnostic code and short message.

Additional information

Display

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the key.

Examples

For the display format:

- ΔS442 Frequency output
- F276 I/O module failure

Timestamp 1

Navigation

Expert → Diagnostics → Diagnostic list → Timestamp

Description

Displays the operating time when the diagnostic message with the highest priority occurred.
### Description of Device Parameters

**Proline Promag 400 Modbus RS485**

#### User interface
- Days (d), hours (h), minutes (m) and seconds (s)

#### Additional information

**Display**
- The diagnostic message can be viewed via the **Diagnostics 1** parameter (→ 137).

**Example**
- For the display format: 24d12h13m00s

---

#### Diagnostics 2

**Navigation**
- **Expert → Diagnostics → Diagnostic list → Diagnostics 2 (0693)**

**Description**
- Displays the current diagnostics message with the second-highest priority.

**User interface**
- Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information**

**Display**
- Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the **key**.

**Examples**
- For the display format:
  - △S442 Frequency output
  - ✗F276 I/O module failure

---

#### Timestamp 2

**Navigation**
- **Expert → Diagnostics → Diagnostic list → Timestamp**

**Description**
- Displays the operating time when the diagnostic message with the second-highest priority occurred.

**User interface**
- Days (d), hours (h), minutes (m) and seconds (s)

**Additional information**

**Display**
- The diagnostic message can be viewed via the **Diagnostics 2** parameter (→ 138).

**Example**
- For the display format: 24d12h13m00s
Diagnostics 3

**Navigation**

Expert → Diagnostics → Diagnostic list → Diagnostics 3 (0694)

**Description**

Displays the current diagnostics message with the third-highest priority.

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information**

_Diplay_

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the ▼ key.

**Examples**

For the display format:
- △S442 Frequency output
- ✗F276 I/O module failure

Timestamp 3

**Navigation**

Expert → Diagnostics → Diagnostic list → Timestamp

**Description**

Displays the operating time when the diagnostic message with the third-highest priority occurred.

**User interface**

Days (d), hours (h), minutes (m) and seconds (s)

**Additional information**

_Diplay_

The diagnostic message can be viewed via the Diagnostics 3 parameter (→ ▼ 139).

**Example**

For the display format:
24d12h13m00s

Diagnostics 4

**Navigation**

Expert → Diagnostics → Diagnostic list → Diagnostics 4 (0695)

**Description**

Displays the current diagnostics message with the fourth-highest priority.

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.
### Additional information

**Display**

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the \( \square \) key.

**Examples**

For the display format:
- \( \Delta S442 \) Frequency output
- \( \times F276 \) I/O module failure

---

#### Timestamp 4

**Navigation**

\( \square \) Expert → Diagnostics → Diagnostic list → Timestamp

**Description**

Displays the operating time when the diagnostic message with the fourth-highest priority occurred.

**User interface**

Days (d), hours (h), minutes (m) and seconds (s)

**Additional information**

**Display**

The diagnostic message can be viewed via the **Diagnostics 4** parameter ( \( \rightarrow \) 139).

**Example**

For the display format:
- 24d12h13m00s

---

#### Diagnostics 5

**Navigation**

\( \square \square \) Expert → Diagnostics → Diagnostic list → Diagnostics 5 (0696)

**Description**

Displays the current diagnostics message with the fifth-highest priority.

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information**

**Display**

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the \( \square \) key.

**Examples**

For the display format:
- \( \Delta S442 \) Frequency output
- \( \times F276 \) I/O module failure
**Timestamp 5**

**Navigation**

Expert → Diagnostics → Diagnostic list → Timestamp

**Description**

Displays the operating time when the diagnostic message with the fifth-highest priority occurred.

**User interface**

Days (d), hours (h), minutes (m) and seconds (s)

**Additional information**

*Display*

The diagnostic message can be viewed via the Diagnostics 5 parameter (→ 140).

*Example*

For the display format:

24d12h13m00s

### 3.6.2 "Event logbook" submenu

**Viewing event messages**

Event messages are displayed in chronological order. The event history includes both diagnostic events and information events. The symbol in front of the timestamp indicates whether the event has started or ended.

**Navigation**

Expert → Diagnostics → Event logbook

**Filter options**

Expert → Diagnostics → Event logbook → Filter options (0705)

**Description**

Use this function to select the category whose event messages are displayed in the event list of the local display.

**Selection**

- All
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- Information (I)
The status signals are categorized in accordance with VDI/VDE 2650 and NAMUR Recommendation NE 107:

- **F** = Failure
- **C** = Function Check
- **S** = Out of Specification
- **M** = Maintenance Required

"Event list" submenu

The **Event list** submenu is only displayed if operating via the local display.

- If operating via the FieldCare operating tool, the event list can be read out with a separate FieldCare module.
- If operating via the Web browser, the event messages can be found directly in the **Event logbook** submenu.

**Navigation**

Expert → Diagnostics → Event logbook → Event list

**Event list**

**Navigation**

Expert → Diagnostics → Event logbook → Event list

**Description**

Displays the history of event messages of the category selected in the **Filter options** parameter (→ 141).

**User interface**

- For a 'Category I' event message
  Information event, short message, symbol for event recording and operating time when error occurred
- For a 'Category F, C, S, M' event message (status signal)
  Diagnostics code, short message, symbol for event recording and operating time when error occurred

**Additional information**

**Description**

A maximum of 20 event messages are displayed in chronological order.
The following symbols indicate whether an event has occurred or has ended:
• ⑤: Occurrence of the event
• ④: End of the event

Examples
For the display format:
• I1091 Configuration modified
  ⑤ 24d12h13m00s
• ΔS442 Frequency output
  ④ 01d04h12min30s
  Additional information, such as remedial measures, can be retrieved via the ⑥ key.

HistoROM
A HistoROM is a "non-volatile" device memory in the form of an EEPROM.
To order the Extended HistoROM application package, see the "Application packages" section of the "Technical Information" document

3.6.3 "Custody transfer logbook" submenu
Only available for Promag W.
For detailed information on the parameter descriptions for custody transfer measurement, see the Special Documentation for the device → ⑦

Navigation
Expert → Diagnostics → Cust.transf.log.

3.6.4 "Device information" submenu

Navigation
Expert → Diagnostics → Device info

Device tag → ⑧ 144
Serial number → ⑧ 144
Firmware version → ⑧ 145
Device name → ⑧ 145
Order code → ⑧ 145
Extended order code 1 → ⑧ 146
Extended order code 2 → ⑧ 146
Device tag

**Navigation**
Expert → Diagnostics → Device info → Device tag (0011)

**Description**
Displays a unique name for the measuring point so it can be identified quickly within the plant. The name is displayed in the header.

**User interface**
Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).

**Factory setting**
Promag

**Additional information**

![User interface](image)

1  *Position of the header text on the display*

The number of characters displayed depends on the characters used.

Serial number

**Navigation**
Expert → Diagnostics → Device info → Serial number (0009)

**Description**
Displays the serial number of the measuring device.

1  The number can be found on the nameplate of the sensor and transmitter.

**User interface**
Max. 11-digit character string comprising letters and numbers.

**Additional information**

- *Uses of the serial number*
  - To identify the measuring device quickly, e.g. when contacting Endress+Hauser.
  - To obtain specific information on the measuring device using the Device Viewer: www.endress.com/deviceviewer
Firmware version

**Navigation**

Expert → Diagnostics → Device info → Firmware version (0010)

**Description**

Displays the device firmware version installed.

**User interface**

Character string in the format xx.yy.zz

**Additional information**

Display

ℹ️ The Firmware version is also located:
- On the title page of the Operating instructions
- On the transmitter nameplate

Device name

**Navigation**

Expert → Diagnostics → Device info → Device name (0013)

**Description**

Displays the name of the transmitter. It can also be found on the nameplate of the transmitter.

**User interface**

Max. 32 characters such as letters or numbers.

**Factory setting**

Promag 400 MB

Order code

**Navigation**

Expert → Diagnostics → Device info → Order code (0008)

**Description**

Displays the device order code.

**User interface**

Character string composed of letters, numbers and certain punctuation marks (e.g. /). 

**Additional information**

Description

ℹ️ The order code can be found on the nameplate of the sensor and transmitter in the 'Order code' field.

The order code is generated from the extended order code through a process of reversible transformation. The extended order code indicates the attributes for all the device features in the product structure. The device features are not directly readable from the order code.

ℹ️ Uses of the order code

- To order an identical spare device.
- To identify the device quickly and easily, e.g. when contacting Endress+Hauser.
Extended order code 1

Navigation:  
Expert → Diagnostics → Device info → Ext. order cd. 1 (0023)

Description: Displays the first part of the extended order code.

On account of length restrictions, the extended order code is split into a maximum of 3 parameters.

User interface: Character string

Additional information:  
Description

The extended order code indicates the version of all the features of the product structure for the measuring device and thus uniquely identifies the measuring device.

The extended order code can also be found on the nameplate of the sensor and transmitter in the "Ext. ord. cd." field.

Extended order code 2

Navigation:  
Expert → Diagnostics → Device info → Ext. order cd. 2 (0021)

Description: Displays the second part of the extended order code.

User interface: Character string

Additional information: For additional information, see Extended order code 1 parameter (→ 146)

Extended order code 3

Navigation:  
Expert → Diagnostics → Device info → Ext. order cd. 3 (0022)

Description: Displays the third part of the extended order code.

User interface: Character string

Additional information: For additional information, see Extended order code 1 parameter (→ 146)

Configuration counter

Navigation:  
Expert → Diagnostics → Device info → Config. counter (2751)

Description: Displays the number of parameter modifications for the device. When the user changes a parameter setting, this counter is incremented.

User interface: 0 to 65535
ENP version

**Navigation**
Expert → Diagnostics → Device info → ENP version (0012)

**Description**
Displays the version of the electronic nameplate.

**User interface**
Character string

**Factory setting**
2.02.00

**Additional information**

This electronic nameplate stores a data record for device identification that includes more data than the nameplates attached to the outside of the device.

3.6.5 "Main electronic module + I/O module 1" submenu

**Navigation**
Expert → Diagnostics → Mainboard module

<table>
<thead>
<tr>
<th>Main electronic module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firmware version</td>
</tr>
<tr>
<td>Build no. software</td>
</tr>
<tr>
<td>Bootloader revision</td>
</tr>
</tbody>
</table>

Firmware version

**Navigation**
Expert → Diagnostics → Main elec. mod. → Firmware version (0072)

**Description**
Use this function to display the software revision of the module.

**User interface**
Positive integer

Build no. software

**Navigation**
Expert → Diagnostics → Main elec. mod. → Build no. softw. (0079)

**Description**
Use this function to display the software build number of the module.

**User interface**
Positive integer
Description of Device Parameters

Proline Promag 400 Modbus RS485

Bootloader revision

Navigation  ⏮  ⏮  Expert → Diagnostics → Main elec. mod. → Bootloader rev. (0073)

Description  Use this function to display the bootloader revision of the software.

User interface  Positive integer

3.6.6  "Sensor electronic module (ISEM)" submenu

Navigation  ⏮  ⏮  Expert → Diagnostics → Sens. electronic

<table>
<thead>
<tr>
<th>Sensor electronic module (ISEM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firmware version (0072)  →  148</td>
</tr>
<tr>
<td>Build no. software (0079)  →  148</td>
</tr>
<tr>
<td>Bootloader revision (0073)  →  149</td>
</tr>
</tbody>
</table>

Firmware version

Navigation  ⏮  ⏮  Expert → Diagnostics → Sens. electronic → Firmware version (0072)

Description  Use this function to display the software revision of the module.

User interface  Positive integer

Build no. software

Navigation  ⏮  ⏮  Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)

Description  Use this function to display the software build number of the module.

User interface  Positive integer
**Bootloader revision**

**Navigation**
Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)

**Description**
Use this function to display the bootloader revision of the software.

**User interface**
Positive integer

---

**3.6.7 "Display module" submenu**

**Navigation**
Expert → Diagnostics → Display module

**Firmware version**

**Navigation**
Expert → Diagnostics → Display module → Firmware version (0072)

**Description**
Use this function to display the software revision of the module.

**User interface**
Positive integer

**Build no. software**

**Navigation**
Expert → Diagnostics → Display module → Build no. softw. (0079)

**Description**
Use this function to display the software build number of the module.

**User interface**
Positive integer
Bootloader revision

Description
Use this function to display the bootloader revision of the software.

User interface
Positive integer

3.6.8 "Data logging" submenu

Navigation
Expert → Diagnostics → Data logging

- Assign channel 1
- Assign channel 2
- Assign channel 3
- Assign channel 4
- Logging interval
- Clear logging data
- Data logging
- Logging delay
- Data logging control
- Data logging status
- Entire logging duration
- Display channel 1
- Display channel 2
- Display channel 3
- Display channel 4
**Assign channel 1**

**Navigation**

Expert → Diagnostics → Data logging → Assign chan. 1 (0851)

**Prerequisite**

The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the Software option overview parameter (→ 39).

**Description**

Use this function to assign a process variable to the logging channel.

**Selection**

- Off
- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Conductivity
- Corrected conductivity
- Temperature
- Electronics temperature
- Current output 1
- Noise
- Coil current shot time
- Reference electrode potential against PE
- Build-up index
- Test point 1
- Test point 2
- Test point 3

**Factory setting**

Off

**Additional information**

Description

A total of 1000 measured values can be logged. This means:

- 1000 data points if 1 logging channel is used
- 500 data points if 2 logging channels are used
- 333 data points if 3 logging channels are used
- 250 data points if 4 logging channels are used

Once the maximum number of data points is reached, the oldest data points in the data log are cyclically overwritten in such a way that the last 1000, 500, 333 or 250 measured values are always in the log (ring memory principle).

The log contents are cleared if the option selected is changed.

**Assign channel 2**

**Navigation**

Expert → Diagnostics → Data logging → Assign chan. 2 (0852)

**Prerequisite**

The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the Software option overview parameter (→ 39).

* Visibility depends on order options or device settings
Description
Use this function to assign a process variable to the logging channel.

Selection
For the picklist, see Assign channel 1 parameter (→ 151)

Factory setting
Off

Assign channel 3

Navigation
Expert → Diagnostics → Data logging → Assign chan. 3 (0853)

Prerequisite
The Extended HistoROM application package is available.

Description
Use this function to assign a process variable to the logging channel.

Selection
For the picklist, see Assign channel 1 parameter (→ 151)

Factory setting
Off

Assign channel 4

Navigation
Expert → Diagnostics → Data logging → Assign chan. 4 (0854)

Prerequisite
The Extended HistoROM application package is available.

Description
Use this function to assign a process variable to the logging channel.

Selection
For the picklist, see Assign channel 1 parameter (→ 151)

Factory setting
Off

Logging interval

Navigation
Expert → Diagnostics → Data logging → Logging interval (0856)

Prerequisite
The Extended HistoROM application package is available.

Description
Use this function to enter the logging interval $T_{log}$ for data logging.

User entry
0.1 to 3 600.0 s
**Factory setting**

1.0 s

**Additional information**

*Description*

This defines the interval between the individual data points in the data log, and thus the maximum loggable process time $T_{\text{log}}$:

- If 1 logging channel is used: $T_{\text{log}} = 1000 \times t_{\text{log}}$
- If 2 logging channels are used: $T_{\text{log}} = 500 \times t_{\text{log}}$
- If 3 logging channels are used: $T_{\text{log}} = 333 \times t_{\text{log}}$
- If 4 logging channels are used: $T_{\text{log}} = 250 \times t_{\text{log}}$

Once this time elapses, the oldest data points in the data log are cyclically overwritten such that a time of $T_{\text{log}}$ always remains in the memory (ring memory principle).

*Example*

If 1 logging channel is used:

- $T_{\text{log}} = 1000 \times 1 \text{ s} = 1000 \text{ s} \approx 15 \text{ min}$
- $T_{\text{log}} = 1000 \times 10 \text{ s} = 10000 \text{ s} \approx 3 \text{ h}$
- $T_{\text{log}} = 1000 \times 80 \text{ s} = 80000 \text{ s} \approx 1 \text{ d}$
- $T_{\text{log}} = 1000 \times 3600 \text{ s} = 3600000 \text{ s} \approx 41 \text{ d}$

**Clear logging data**

**Navigation**

Expert → Diagnostics → Data logging → Clear logging (0855)

**Prerequisite**

The *Extended HistoROM* application package is available.

*The software options currently enabled are displayed in the Software option overview parameter (→ 39).*

**Description**

Use this function to clear the entire logging data.

**Selection**

- Cancel
- Clear data

**Additional information**

*Options*

- Cancel
  
  The data is not cleared. All the data is retained.
- Clear data
  
  The logging data is cleared. The logging process starts from the beginning.

**Data logging**

**Navigation**

Expert → Diagnostics → Data logging → Data logging (0860)

**Description**

Use this function to select the data logging method.
Selection

- Overwriting
- Not overwriting

Factory setting

Overwriting

Additional information

Options

- Overwriting
  The device memory applies the FIFO principle.
- Not overwriting
  Data logging is canceled if the measured value memory is full (single shot).

Logging delay

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Data logging → Logging delay (0859)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>In the Data logging parameter (→ 153), the Not overwriting option is selected.</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to enter the time delay for measured value logging.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 999 h</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0 h</td>
</tr>
<tr>
<td>Additional information</td>
<td>Description</td>
</tr>
<tr>
<td></td>
<td>Once measured value logging has been started with the Data logging control parameter (→ 154), the device does not log any data for the duration of the time delay entered.</td>
</tr>
</tbody>
</table>

Data logging control

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Data logging → Data log.control (0857)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>In the Data logging parameter (→ 153), the Not overwriting option is selected.</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to start and stop measured value logging.</td>
</tr>
</tbody>
</table>
| Selection | None
- Delete + start
- Stop |
| Factory setting | None |
| Additional information | Options |
| | None |
| | Initial measured value logging status. |
| | Delete + start |
| | All the measured values recorded for all the channels are deleted and measured value logging starts again. |
| | Stop |
| | Measured value logging is stopped. |
**Data logging status**

**Navigation**

Exp. → Diagnostics → Data logging → Data log. status (0858)

**Prerequisite**

In the Data logging parameter (→ 153), the Not overwriting option is selected.

**Description**

Displays the measured value logging status.

**User interface**

- Done
- Delay active
- Active
- Stopped

**Factory setting**

Done

**Additional information**

*Options*

- Done
  Measured value logging has been performed and completed successfully.
- Delay active
  Measured value logging has been started but the logging interval has not yet elapsed.
- Active
  The logging interval has elapsed and measured value logging is active.
- Stopped
  Measured value logging is stopped.

**Entire logging duration**

**Navigation**

Exp. → Diagnostics → Data logging → Logging duration (0861)

**Prerequisite**

In the Data logging parameter (→ 153), the Not overwriting option is selected.

**Description**

Displays the total logging duration.

**User interface**

Positive floating-point number

**Factory setting**

0 s

"Display channel 1" submenu

**Navigation**

Exp. → Diagnostics → Data logging → Displ.channel 1
Display channel 1

Navigation

Expert → Diagnostics → Data logging → Displ.channel 1

Prerequisite

The Extended HistoROM application package is available.

The software options currently enabled are displayed in the Software option overview parameter (→ 39).

In the Assign channel 1 parameter (→ 151), one of the following options is selected:

- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Conductivity
- Corrected conductivity *
- Temperature
- Electronics temperature
- Current output 1

Description

Displays the measured value history for the logging channel in the form of a diagram.

Additional information

Description

![Chart of a measured value trend](image)

- x-axis: depending on the number of channels selected displays 250 to 1000 measured values of a process variable.
- y-axis: displays the approximate measured value span and constantly adapts this to the ongoing measurement.

"Display channel 2" submenu

Navigation

Expert → Diagnostics → Data logging → Displ.channel 2

Visibility depends on order options or device settings
Display channel 2

**Navigation**

Expert → Diagnostics → Data logging → Displ.channel 2

**Prerequisite**

A process variable is determined in the **Assign channel 2** parameter.

**Description**

See the **Display channel 1** parameter

"Display channel 3" submenu

**Navigation**

Expert → Diagnostics → Data logging → Displ.channel 3

**Display channel 3**

**Navigation**

Expert → Diagnostics → Data logging → Displ.channel 3

**Prerequisite**

A process variable is determined in the **Assign channel 3** parameter.

**Description**

See the **Display channel 1** parameter

"Display channel 4" submenu

**Navigation**

Expert → Diagnostics → Data logging → Displ.channel 4

**Display channel 4**

**Navigation**

Expert → Diagnostics → Data logging → Displ.channel 4

**Prerequisite**

A process variable is determined in the **Assign channel 4** parameter.
Description of Device Parameters

Proline Promag 400 Modbus RS485

Description
See the Display channel 1 parameter

3.6.9 "Min/max values" submenu

Navigation
Expert → Diagnostics → Min/max val.

"Main electronics temperature" submenu

Navigation
Expert → Diagnostics → Min/max val. → Main elect.temp.

Minimum value

Navigation
Expert → Diagnostics → Min/max val. → Main elect.temp. → Minimum value (6547)

Description
Displays the lowest previously measured temperature value of the main electronics module.

User interface
Signed floating-point number

Additional information
Dependency
The unit is taken from the Temperature unit parameter (→ 51)

Maximum value

Navigation
Expert → Diagnostics → Min/max val. → Main elect.temp. → Maximum value (6545)

Description
Displays the highest previously measured temperature value of the main electronics module.
User interface
Signed floating-point number

Additional information
Dependency

"Medium temperature" submenu

Navigation
Expert → Diagnostics → Min/max val. → Medium temp.

Minimum value

Navigation
Expert → Diagnostics → Min/max val. → Medium temp. → Minimum value (6681)

Description
Displays the lowest previously measured medium temperature value.

User interface
Signed floating-point number

Additional information
Dependency

The unit is taken from the Temperature unit parameter (→ 51)

Maximum value

Navigation
Expert → Diagnostics → Min/max val. → Medium temp. → Maximum value (6680)

Description
Displays the highest previously measured medium temperature value.

User interface
Signed floating-point number

Additional information
Dependency

The unit is taken from the Temperature unit parameter (→ 51)
3.6.10  "Heartbeat" submenu

For detailed information on the parameter descriptions for the Heartbeat Verification+Monitoring application package, refer to the Special Documentation for the device → 7

Navigation    Expert → Diagnostics → HBT

3.6.11  "Simulation" submenu

Navigation    Expert → Diagnostics → Simulation

Assign simulation process variable (1810) → 161
Process variable value (1811) → 161
Current output 1 simulation (0354–1) → 162
Current output value (0355) → 162
Frequency output 1 to n simulation (0472–1 to n) → 162
Frequency output 1 to n value (0473–1 to n) → 163
Pulse output simulation 1 to n (0458–1 to n) → 163
Pulse value 1 to n (0459–1 to n) → 164
Switch output simulation 1 to n (0462–1 to n) → 164
Switch state 1 to n (0463–1 to n) → 165
Device alarm simulation (0654) → 165
Diagnostic event category (0738) → 166
Diagnostic event simulation (0737) → 166
Assign simulation process variable

Navigation

Expert → Diagnostics → Simulation → Assign proc. var. (1810)

Description

Use this function to select a process variable for the simulation process that is activated. The display alternates between the measured value and a diagnostic message of the “Function check” category (C) while simulation is in progress.

Selection

- Off
- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Conductivity
- Corrected conductivity
- Temperature

Factory setting

Off

Additional information

Description

The simulation value of the process variable selected is defined in the Process variable value parameter (→ 161).

Process variable value

Navigation

Expert → Diagnostics → Simulation → Proc. var. value (1811)

Prerequisite

A process variable is selected in the Assign simulation process variable parameter (→ 161).

Description

Use this function to enter a simulation value for the selected process variable. Subsequent measured value processing and the signal output use this simulation value. In this way, users can verify whether the measuring device has been configured correctly.

User entry

Depends on the process variable selected

Factory setting

0

Additional information

User entry

The unit of the displayed measured value is taken from the System units submenu (→ 47).

* Visibility depends on order options or device settings
Current output 1 simulation

**Navigation**

- Expert → Diagnostics → Simulation → Curr.outp 1 sim. (0354–1)

**Description**

Use this function to switch simulation of the current output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

**Selection**

- Off
- On

**Factory setting**

Off

**Additional information**

**Description**

The desired simulation value is specified in the Value current output 1 parameter (→ 162).

**Selection**

- Off
  Current simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Current simulation is active.

Value current output 1

**Navigation**

- Expert → Diagnostics → Simulation → Curr.outp val. (0355)
- Expert → Diagnostics → Simulation → Value curr.outp 1 (0355–1)

**Prerequisite**

In the Current output 1 simulation parameter, the On option is selected.

**Description**

Use this function to enter a current value for the simulation. In this way, users can verify the correct adjustment of the current output and the correct function of downstream switching units.

**User entry**

0 to 22.5 mA

**Additional information**

**User entry**

The value must be entered with a period (.) as the separator.

Frequency output 1 to n simulation

**Navigation**

- Expert → Diagnostics → Simulation → Freq.outp 1 to n sim. (0472–1 to n)

**Prerequisite**

In the Operating mode parameter (→ 95), the Frequency option is selected.
**Description**

Use this function to switch simulation of the frequency output on and off. The display alternates between the measured value and a diagnostic message of the ‘Function check’ category (C) while simulation is in progress.

**Selection**

- Off
- On

**Factory setting**

Off

**Additional information**

Description

The desired simulation value is defined in the **Frequency value 1 to n** parameter.

**Selection**

- Off
  - Frequency simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  - Frequency simulation is active.

### Frequency output 1 to n value

**Navigation**

Expert → Diagnostics → Simulation → Freq.outp 1 to n val. (0473–1 to n)

**Prerequisite**

In the **Frequency simulation 1 to n** parameter, the **On** option is selected.

**Description**

Use this function to enter a frequency value for the simulation. In this way, users can verify the correct adjustment of the frequency output and the correct function of downstream switching units.

**User entry**

0.0 to 12 500.0 Hz

### Pulse output simulation 1 to n

**Navigation**

Expert → Diagnostics → Simulation → Puls.outp.sim. 1 to n (0458–1 to n)

**Prerequisite**

In the **Operating mode** parameter (→ 95), the **Pulse** option is selected.

**Description**

Use this function to switch simulation of the pulse output on and off. The display alternates between the measured value and a diagnostic message of the ‘Function check’ category (C) while simulation is in progress.

**Selection**

- Off
- Fixed value
- Down-counting value

**Factory setting**

Off
Additional information

Description

The desired simulation value is defined in the **Pulse value 1 to n** parameter.

Selection

- Off
  Pulse simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Fixed value
  Pulses are continuously output with the pulse width specified in the **Pulse width** parameter (→ 98).
- Down-counting value
  The pulses specified in the **Pulse value** parameter (→ 164) are output.

Pulse value 1 to n

Navigation

Expert → Diagnostics → Simulation → Pulse value 1 to n (0459–1 to n)

Prerequisite

In the **Pulse output simulation 1 to n** parameter, the **Down-counting value** option is selected.

Description

Use this function to enter a pulse value for the simulation. In this way, users can verify the correct adjustment of the pulse output and the correct function of downstream switching units.

User entry

0 to 65535

Switch output simulation 1 to n

Navigation

Expert → Diagnostics → Simulation → Switch sim. 1 to n (0462–1 to n)

Prerequisite

In the **Operating mode** parameter (→ 95), the **Switch** option is selected.

Description

Use this function to switch simulation of the switch output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- On

Factory setting

Off
Additional information

Description

The desired simulation value is defined in the **Switch state 1 to n** parameter.

Selection

- Off
  
  Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.

- On
  
  Switch simulation is active.

---

**Switch state 1 to n**

Navigation

Expert → Diagnostics → Simulation → Switch state 1 to n (0463–1 to n)

Description

Use this function to select a switch value for the simulation. In this way, users can verify the correct adjustment of the switch output and the correct function of downstream switching units.

Selection

- Open
- Closed

Additional information

Selection

- Open
  
  Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.

- Closed
  
  Switch simulation is active.

---

**Device alarm simulation**

Navigation

Expert → Diagnostics → Simulation → Dev. alarm sim. (0654)

Description

Use this function to switch the device alarm on and off.

Selection

- Off
- On

Factory setting

Off

Additional information

Description

The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.
**Diagnostic event category**

**Navigation**
- Expert → Diagnostics → Simulation → Event category (0738)

**Description**
Use this function to select the category of the diagnostic events that are displayed for the simulation in the Diagnostic event simulation parameter (→ 166).

**Selection**
- Sensor
- Electronics
- Configuration
- Process

**Factory setting**
Process

**Diagnostic event simulation**

**Navigation**
- Expert → Diagnostics → Simulation → Diag. event sim. (0737)

**Description**
Use this function to select a diagnostic event for the simulation process that is activated.

**Selection**
- Off
- Diagnostic event picklist (depends on the category selected)

**Factory setting**
Off

**Additional information**
- For the simulation, you can choose from the diagnostic events of the category selected in the Diagnostic event category parameter (→ 166).
4 Country-specific factory settings

4.1 SI units

Not valid for USA and Canada.

4.1.1 System units

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<thead>
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<th>Parameter</th>
<th>Unit</th>
<th>Option</th>
</tr>
</thead>
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<td>l/h</td>
<td>option</td>
</tr>
<tr>
<td>Volume</td>
<td>m³</td>
<td>option</td>
</tr>
<tr>
<td>Conductivity</td>
<td>µS/cm</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>°C</td>
<td>option</td>
</tr>
<tr>
<td>Mass flow</td>
<td>kg/h</td>
<td>option</td>
</tr>
<tr>
<td>Mass</td>
<td>kg</td>
<td>option</td>
</tr>
<tr>
<td>Density</td>
<td>kg/l</td>
<td>option</td>
</tr>
</tbody>
</table>

4.1.2 Full scale values

The factory settings apply to the following parameters:

100% bar graph value 1

<table>
<thead>
<tr>
<th>Nominal diameter [mm]</th>
<th>(v ~ 2.5 m/s) [dm³/min]</th>
<th>(v ~ 2.5 m/s) [m³/h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>75</td>
<td>113</td>
</tr>
<tr>
<td>32</td>
<td>125</td>
<td>162</td>
</tr>
<tr>
<td>40</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>50</td>
<td>300</td>
<td>450</td>
</tr>
<tr>
<td>65</td>
<td>500</td>
<td>750</td>
</tr>
<tr>
<td>80</td>
<td>750</td>
<td>1000</td>
</tr>
<tr>
<td>100</td>
<td>1200</td>
<td>1800</td>
</tr>
<tr>
<td>125</td>
<td>1850</td>
<td>2700</td>
</tr>
<tr>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>200</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>250</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>300</td>
<td>750</td>
<td>750</td>
</tr>
<tr>
<td>350</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>375</td>
<td>1200</td>
<td>1200</td>
</tr>
<tr>
<td>400</td>
<td>1200</td>
<td>1200</td>
</tr>
<tr>
<td>500</td>
<td>2000</td>
<td>2000</td>
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<tr>
<td>600</td>
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<td>2500</td>
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<td>700</td>
<td>3500</td>
<td>3500</td>
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<tr>
<td>750</td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>800</td>
<td>4500</td>
<td>4500</td>
</tr>
<tr>
<td>Nominal diameter [mm]</td>
<td>( v \approx 2.5 \text{ m/s} ) [m³/h]</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------------------------</td>
<td></td>
</tr>
<tr>
<td>900</td>
<td>6000</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>7000</td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td>10000</td>
<td></td>
</tr>
<tr>
<td>1400</td>
<td>14000</td>
<td></td>
</tr>
<tr>
<td>1600</td>
<td>18000</td>
<td></td>
</tr>
<tr>
<td>1800</td>
<td>23000</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>28500</td>
<td></td>
</tr>
<tr>
<td>2200</td>
<td>34000</td>
<td></td>
</tr>
<tr>
<td>2400</td>
<td>40000</td>
<td></td>
</tr>
<tr>
<td>2600</td>
<td>48000</td>
<td></td>
</tr>
<tr>
<td>2800</td>
<td>55500</td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td>63500</td>
<td></td>
</tr>
</tbody>
</table>

### 4.1.3 Switch-on point low flow cut off

The switch-on point depends on the type of medium and the nominal diameter.

<table>
<thead>
<tr>
<th>Nominal diameter [mm]</th>
<th>( v \approx 0.04 \text{ m/s} ) [dm³/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>32</td>
<td>2</td>
</tr>
<tr>
<td>40</td>
<td>3</td>
</tr>
<tr>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td>65</td>
<td>8</td>
</tr>
<tr>
<td>80</td>
<td>12</td>
</tr>
<tr>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>125</td>
<td>30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal diameter [mm]</th>
<th>( v \approx 0.04 \text{ m/s} ) [m³/h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>2.5</td>
</tr>
<tr>
<td>200</td>
<td>5</td>
</tr>
<tr>
<td>250</td>
<td>7.5</td>
</tr>
<tr>
<td>300</td>
<td>10</td>
</tr>
<tr>
<td>350</td>
<td>15</td>
</tr>
<tr>
<td>375</td>
<td>20</td>
</tr>
<tr>
<td>400</td>
<td>20</td>
</tr>
<tr>
<td>450</td>
<td>25</td>
</tr>
<tr>
<td>500</td>
<td>30</td>
</tr>
<tr>
<td>600</td>
<td>40</td>
</tr>
<tr>
<td>700</td>
<td>50</td>
</tr>
<tr>
<td>750</td>
<td>60</td>
</tr>
<tr>
<td>800</td>
<td>75</td>
</tr>
</tbody>
</table>
4.2 US units

Only valid for USA and Canada.

4.2.1 System units

<table>
<thead>
<tr>
<th>Volume flow</th>
<th>gal/min (us) option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>gal (us) option</td>
</tr>
<tr>
<td>Temperature</td>
<td>°F option</td>
</tr>
<tr>
<td>Mass flow</td>
<td>lb/min option</td>
</tr>
<tr>
<td>Mass</td>
<td>lb option</td>
</tr>
<tr>
<td>Density</td>
<td>lb/ft³ option</td>
</tr>
</tbody>
</table>

4.2.2 Full scale values

The factory settings apply to the following parameters: 100% bar graph value 1

<table>
<thead>
<tr>
<th>Nominal diameter [in]</th>
<th>(v ~ 2.5 m/s) [gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>1½</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>75</td>
</tr>
<tr>
<td>3</td>
<td>200</td>
</tr>
<tr>
<td>4</td>
<td>300</td>
</tr>
<tr>
<td>6</td>
<td>600</td>
</tr>
<tr>
<td>8</td>
<td>1200</td>
</tr>
<tr>
<td>10</td>
<td>1500</td>
</tr>
<tr>
<td>12</td>
<td>2400</td>
</tr>
<tr>
<td>14</td>
<td>3600</td>
</tr>
<tr>
<td>15</td>
<td>4800</td>
</tr>
</tbody>
</table>
### Country-specific factory settings

#### Proline Promag 400 Modbus RS485

<table>
<thead>
<tr>
<th>Nominal diameter [in]</th>
<th>((v \sim 2.5 \text{ m/s})) [gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>4800</td>
</tr>
<tr>
<td>18</td>
<td>6000</td>
</tr>
<tr>
<td>20</td>
<td>7500</td>
</tr>
<tr>
<td>24</td>
<td>10500</td>
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<tr>
<td>28</td>
<td>13500</td>
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<tr>
<td>30</td>
<td>16500</td>
</tr>
<tr>
<td>32</td>
<td>19500</td>
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<td>36</td>
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<td>40</td>
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<tr>
<td>42</td>
<td>33000</td>
</tr>
<tr>
<td>48</td>
<td>42000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal diameter [in]</th>
<th>((v \sim 2.5 \text{ m/s})) [Mgal/d]</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td>75</td>
</tr>
<tr>
<td>60</td>
<td>95</td>
</tr>
<tr>
<td>66</td>
<td>120</td>
</tr>
<tr>
<td>72</td>
<td>140</td>
</tr>
<tr>
<td>78</td>
<td>175</td>
</tr>
<tr>
<td>84</td>
<td>190</td>
</tr>
<tr>
<td>90</td>
<td>220</td>
</tr>
<tr>
<td>96</td>
<td>265</td>
</tr>
<tr>
<td>102</td>
<td>300</td>
</tr>
<tr>
<td>108</td>
<td>340</td>
</tr>
<tr>
<td>114</td>
<td>375</td>
</tr>
<tr>
<td>120</td>
<td>415</td>
</tr>
</tbody>
</table>

### 4.2.3 Switch-on point low flow cut off

The switch-on point depends on the type of medium and the nominal diameter.

<table>
<thead>
<tr>
<th>Nominal diameter [in]</th>
<th>((v \sim 0.04 \text{ m/s})) [gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>1½</td>
<td>0.75</td>
</tr>
<tr>
<td>2</td>
<td>1.25</td>
</tr>
<tr>
<td>3</td>
<td>2.5</td>
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<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>12</td>
<td>45</td>
</tr>
<tr>
<td>14</td>
<td>60</td>
</tr>
<tr>
<td>Nominal diameter [in]</td>
<td>(v ~ 0.04 m/s) [gal/min]</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>16</td>
<td>60</td>
</tr>
<tr>
<td>18</td>
<td>90</td>
</tr>
<tr>
<td>20</td>
<td>120</td>
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<td>24</td>
<td>180</td>
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<tr>
<td>28</td>
<td>210</td>
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<td>30</td>
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<td>32</td>
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<td>36</td>
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<td>40</td>
<td>480</td>
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<tr>
<td>42</td>
<td>600</td>
</tr>
<tr>
<td>48</td>
<td>600</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal diameter [in]</th>
<th>(v ~ 0.04 m/s) [Mgal/d]</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td>1.3</td>
</tr>
<tr>
<td>60</td>
<td>1.3</td>
</tr>
<tr>
<td>66</td>
<td>2.2</td>
</tr>
<tr>
<td>72</td>
<td>2.6</td>
</tr>
<tr>
<td>78</td>
<td>3.0</td>
</tr>
<tr>
<td>84</td>
<td>3.2</td>
</tr>
<tr>
<td>90</td>
<td>3.6</td>
</tr>
<tr>
<td>96</td>
<td>4.0</td>
</tr>
<tr>
<td>102</td>
<td>5.0</td>
</tr>
<tr>
<td>108</td>
<td>5.0</td>
</tr>
<tr>
<td>114</td>
<td>6.0</td>
</tr>
<tr>
<td>120</td>
<td>7.0</td>
</tr>
</tbody>
</table>
## 5 Explanation of abbreviated units

### 5.1 SI units

<table>
<thead>
<tr>
<th>Process variable</th>
<th>Units</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>g/cm³, g/m³</td>
<td>Gram/volume unit</td>
</tr>
<tr>
<td></td>
<td>kg/dm³, kg/l, kg/m³</td>
<td>Kilogram/volume unit</td>
</tr>
<tr>
<td></td>
<td>SD4°C, SD15°C, SD20°C</td>
<td>Specific density: The specific density is the ratio of the density of the fluid to the density of water at a temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).</td>
</tr>
<tr>
<td></td>
<td>SG4°C, SG15°C, SG20°C</td>
<td>Specific gravity: The specific gravity is the ratio of the density of the fluid to the density of water at a temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).</td>
</tr>
<tr>
<td>Conductivity</td>
<td>µS/mm</td>
<td>Microsiemens/length unit</td>
</tr>
<tr>
<td></td>
<td>nS/cm, µS/cm, mS/cm, S/cm</td>
<td>Nano- , Micro- , Milli- , Siemens/length unit</td>
</tr>
<tr>
<td></td>
<td>µS/m, mS/m, S/m, kS/m, MS/m</td>
<td>Micro- , Milli- , Siemens, Kilo-,Megasiemens/length unit</td>
</tr>
<tr>
<td>Mass</td>
<td>g, kg, t</td>
<td>Gram, kilogram, metric ton</td>
</tr>
<tr>
<td>Mass flow</td>
<td>g/s, g/min, g/h, g/d</td>
<td>Gram/time unit</td>
</tr>
<tr>
<td></td>
<td>kg/s, kg/min, kg/h, kg/d</td>
<td>Kilogram/time unit</td>
</tr>
<tr>
<td></td>
<td>t/s, t/min, t/h, t/d</td>
<td>Metric ton/time unit</td>
</tr>
<tr>
<td>Temperature</td>
<td>°C, K</td>
<td>Celsius, Kelvin</td>
</tr>
<tr>
<td>Volume</td>
<td>cm³, dm³, m³</td>
<td>Cubic centimeter, cubic decimeter, cubic meter</td>
</tr>
<tr>
<td></td>
<td>ml, l, hl, ML Mega</td>
<td>Milliliter, liter, hectoliter, megaliter</td>
</tr>
<tr>
<td>Volume flow</td>
<td>cm³/s, cm³/min, cm³/h, cm³/d</td>
<td>Cubic centimeter/time unit</td>
</tr>
<tr>
<td></td>
<td>dm³/s, dm³/min, dm³/h, dm³/d</td>
<td>Cubic decimeter/time unit</td>
</tr>
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<td>m³/s, m³/min, m³/h, m³/d</td>
<td>Cubic meter/time unit</td>
</tr>
<tr>
<td></td>
<td>ml/s, ml/min, ml/h, ml/d</td>
<td>Milliliter/time unit</td>
</tr>
<tr>
<td></td>
<td>l/s, l/min, l/h, l/d</td>
<td>Liter/time unit</td>
</tr>
<tr>
<td></td>
<td>hl/s, hl/min, hl/h, hl/d</td>
<td>Hectoliter/time unit</td>
</tr>
<tr>
<td></td>
<td>Ml/s, Ml/min, Ml/h, Ml/d</td>
<td>Megaliter/time unit</td>
</tr>
<tr>
<td>Time</td>
<td>s, m, h, d, y</td>
<td>Second, minute, hour, day, year</td>
</tr>
</tbody>
</table>

### 5.2 US units

<table>
<thead>
<tr>
<th>Process variable</th>
<th>Units</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>lb/ft³, lb/gal (us)</td>
<td>Pound/cubic foot, pound/gallon</td>
</tr>
<tr>
<td></td>
<td>lb/bbl (us;lg.), lb/bbl (us;beer), lb/bbl (us;oil), lb/bbl (us;tank)</td>
<td>Pound/volume unit</td>
</tr>
<tr>
<td>Mass</td>
<td>oz, lb, STon</td>
<td>Ounce, pound, standard ton</td>
</tr>
<tr>
<td>Mass flow</td>
<td>oz/s, oz/min, oz/h, oz/d</td>
<td>Ounce/time unit</td>
</tr>
<tr>
<td></td>
<td>lb/s, lb/min, lb/h, lb/d</td>
<td>Pound/time unit</td>
</tr>
<tr>
<td></td>
<td>STon/s, STon/min, STon/h, STon/d</td>
<td>Standard ton/time unit</td>
</tr>
<tr>
<td>Temperature</td>
<td>°F, °R</td>
<td>Fahrenheit, Rankine</td>
</tr>
<tr>
<td>Volume</td>
<td>af</td>
<td>Acre foot</td>
</tr>
</tbody>
</table>
### Process variable | Units | Explanation
--- | --- | ---
| ft³ | Cubic foot |
| fl oz (us), gal (us), kgal (us), Mgal (us) | Fluid ounce, gallon, kilogallon, million gallon |
| bbl (us;liq.), bbl (us;beer), bbl (us;oil), bbl (us;tank) | Barrel (normal liquids), barrel (beer), barrel (petrochemicals), barrel (filling tanks) |

### Volume flow

| Process variable | Units | Explanation |
--- | --- | ---
| ft³/s, ft³/min, ft³/h, ft³/d | Cubic foot/time unit |
| fl oz/s (us), fl oz/min (us), fl oz/h (us), fl oz/d (us) | Fluid ounce/time unit |
| gal/s (us), gal/min (us), gal/h (us), gal/d (us) | Gallon/time unit |
| kgal/s (us), kgal/min (us), kgal/h (us), kgal/d (us) | Kilogallon/time unit |
| Mgal/s (us), Mgal/min (us), Mgal/h (us), Mgal/d (us) | Million gallon/time unit |
| bbl/s (us;liq.), bbl/min (us;liq.), bbl/h (us;liq.), bbl/d (us;liq.) | Barrel/time unit (normal liquids) |
| bbl/s (us;beer), bbl/min (us;beer), bbl/h (us;beer), bbl/d (us;beer) | Barrel/time unit (beer) |
| bbl/s (us;oil), bbl/min (us;oil), bbl/h (us;oil), bbl/d (us;oil) | Barrel/time unit (petrochemicals) |
| bbl/s (us;tank), bbl/min (us;tank), bbl/h (us;tank), bbl/d (us;tank) | Barrel/time unit (filling tank) |

### Time

| Process variable | Units | Explanation |
--- | --- | ---
| s, m, h, d, y | Second, minute, hour, day, year |
| am, pm | Ante meridiem (before midday), post meridiem (after midday) |

### 5.3 Imperial units

| Process variable | Units | Explanation |
--- | --- | ---
| Density | lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil) | Pound/volume unit |
| Volume | gal (imp), Mgal (imp) | Gallon, mega gallon |
| bbl (imp;beer), bbl (imp;oil) | Barrel (beer), barrel (petrochemicals) |
| Volume flow | gal/s (imp), gal/min (imp), gal/h (imp), gal/d (imp) | Gallon/time unit |
| Mgal/s (imp), Mgal/min (imp), Mgal/h (imp), Mgal/d (imp) | Mega gallon/time unit |
| bbl/s (imp;beer), bbl/min (imp;beer), bbl/h (imp;beer), bbl/d (imp;beer) | Barrel/time unit (beer) |
| Beer: 36.0 gal/bbl |
| bbl/s (imp;oil), bbl/min (imp;oil), bbl/h (imp;oil), bbl/d (imp;oil) | Barrel/time unit (petrochemicals) |
| Petrochemicals: 34.97 gal/bbl |
| Time | s, m, h, d, y | Second, minute, hour, day, year |
| am, pm | Ante meridiem (before midday), post meridiem (after midday) |
6 Modbus RS485 register information

6.1 Notes

6.1.1 Structure of the register information
The individual parts of a parameter description are described in the following section:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access type</th>
<th>User interface/Selection/User entry</th>
<th>Options</th>
<th>User entry</th>
</tr>
</thead>
</table>
| Name of parameter | Indicated in decimal numerical format | • Float length = 4 byte  
• Integer length = 2 byte  
• String length, depending on parameter | Possible type of access to parameter:  
• Read access via function codes 03, 04 or 23  
• Write access via function codes 06, 16 or 23 | Page number information and cross-reference to the standard parameter description |

**NOTICE**
If non-volatile device parameters are modified via the MODBUS RS485 function codes 06, 16 or 23, the change is saved in the EEPROM of the measuring device.
The number of writes to the EEPROM is technically restricted to a maximum of 1 million.

- Make sure to comply with this limit since, if it is exceeded, data loss and measuring device failure will result.
- Avoid constantly writing non-volatile device parameters via the MODBUS RS485.

6.1.2 Address model
The Modbus RS485 register addresses of the measuring device are implemented in accordance with the "Modbus Applications Protocol Specification V1.1".

In addition, systems are used that work with the register address model "Modicon Modbus Protocol Reference Guide (PI-MBUS-300 Rev. J)".

Depending on the function code used, a number is added at the start of the register address with this specification:

- "3" → "Read" access  
- "4" → "Write" access

|---------------|-------------|---------------------------------------------------------------------|---------------------------------------------------------------------|
| 03 04 23      | Read        | XXXX  
Example: mass flow = 2007                                            | 3XXXX  
Example: mass flow = 32007                                         |
| 06 16 23      | Write       | XXXX  
Example: reset totalizer = 6401                                       | 4XXXX  
Example: reset totalizer = 46401                                    |
6.2 Overview of the Expert operating menu

The following table provides an overview of the menu structure of the expert operating menu and its parameters. The page reference indicates where the associated description of the submenu or parameter can be found.

<table>
<thead>
<tr>
<th>Expert</th>
<th>System</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct access (0106)</td>
<td>→  175 181</td>
<td>→  182</td>
</tr>
<tr>
<td>Locking status (0004)</td>
<td>→  181</td>
<td>→  182</td>
</tr>
<tr>
<td>Access status display (0091)</td>
<td>→  181</td>
<td>→  182</td>
</tr>
<tr>
<td>Access status tooling (0005)</td>
<td>→  181</td>
<td>→  182</td>
</tr>
<tr>
<td>Enter access code (0003)</td>
<td>→  181</td>
<td>→  182</td>
</tr>
<tr>
<td>‣ System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>‣ Display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display language (0104)</td>
<td>→  182</td>
<td>→  182</td>
</tr>
<tr>
<td>Format display (0098)</td>
<td>→  182</td>
<td>→  182</td>
</tr>
<tr>
<td>Value 1 display (0107)</td>
<td>→  182</td>
<td>→  182</td>
</tr>
<tr>
<td>0% bargraph value 1 (0123)</td>
<td>→  182</td>
<td>→  182</td>
</tr>
<tr>
<td>100% bargraph value 1 (0125)</td>
<td>→  182</td>
<td>→  182</td>
</tr>
<tr>
<td>Decimal places 1 (0095)</td>
<td>→  182</td>
<td>→  182</td>
</tr>
<tr>
<td>Value 2 display (0108)</td>
<td>→  182</td>
<td>→  182</td>
</tr>
<tr>
<td>Decimal places 2 (0117)</td>
<td>→  182</td>
<td>→  182</td>
</tr>
<tr>
<td>Value 3 display (0110)</td>
<td>→  183</td>
<td>→  183</td>
</tr>
<tr>
<td>0% bargraph value 3 (0124)</td>
<td>→  183</td>
<td>→  183</td>
</tr>
<tr>
<td>100% bargraph value 3 (0126)</td>
<td>→  183</td>
<td>→  183</td>
</tr>
<tr>
<td>Decimal places 3 (0118)</td>
<td>→  183</td>
<td>→  183</td>
</tr>
<tr>
<td>Value 4 display (0109)</td>
<td>→  183</td>
<td>→  183</td>
</tr>
<tr>
<td>Decimal places 4 (0119)</td>
<td>→  183</td>
<td>→  183</td>
</tr>
<tr>
<td>Modbus RS485 register information</td>
<td>Proline Promag 400 Modbus RS485</td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td>---------------------------------</td>
<td></td>
</tr>
<tr>
<td>Display interval (0096)</td>
<td>→ 183</td>
<td></td>
</tr>
<tr>
<td>Display damping (0094)</td>
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<tr>
<td>Header (0097)</td>
<td>→ 183</td>
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<tr>
<td>Header text (0112)</td>
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<td></td>
</tr>
<tr>
<td>Separator (0101)</td>
<td>→ 183</td>
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<tr>
<td>Contrast display (0105)</td>
<td>→ 183</td>
<td></td>
</tr>
<tr>
<td>Backlight (0111)</td>
<td>→ 183</td>
<td></td>
</tr>
<tr>
<td>Access status display (0091)</td>
<td>→ 183</td>
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</tr>
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- **Diagnostic handling**
  - Alarm delay (0651) → 183

- **Diagnostic behavior**

- **Administration**
  - **Define access code**
    - Device reset (0000) → 184
    - Activate SW option (0029) → 184
    - Software option overview (0015) → 184

- **Sensor**
  - **Measured values**
    - **Process variables**
    - **Totalizer**

- **System units**
  - Volume flow unit (0553) → 186
  - Volume unit (0563) → 187
  - Conductivity unit (0582) → 187
  - Temperature unit (0557) → 187
### Proline Promag 400 Modbus RS485

#### Modbus RS485 register information

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<tr>
<td>Mass unit (0574)</td>
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<tr>
<td>Density unit (0555)</td>
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<td>Date/time format (2812)</td>
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<tr>
<td>User-specific units</td>
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<tr>
<td>Mass unit (0574)</td>
<td>188</td>
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<tr>
<td>Density unit (0555)</td>
<td>188</td>
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<tr>
<td>Date/time format (2812)</td>
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<tr>
<td>User-specific units</td>
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<td>Filter options (6710)</td>
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<tr>
<td>Sensor adjustment</td>
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<td>Installation direction (1809)</td>
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<td>Integration time (6533)</td>
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<td>Measuring period (6536)</td>
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<td>Process variable adjustment</td>
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<td>Data transfer mode (7115)</td>
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<td>Failure mode (7116)</td>
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<table>
<thead>
<tr>
<th>Modbus information</th>
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<tbody>
<tr>
<td>Device ID (7153)</td>
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<td>Device revision (7154)</td>
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<thead>
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<th>Modbus data map</th>
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<tr>
<td>Scan list register 0 to 15 (7114)</td>
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<td>Web server language (7221)</td>
</tr>
<tr>
<td>MAC address (7214)</td>
</tr>
<tr>
<td>IP address (7209)</td>
</tr>
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<td>Subnet mask (7211)</td>
</tr>
<tr>
<td>Default gateway (7210)</td>
</tr>
<tr>
<td>Web server functionality (7222)</td>
</tr>
</tbody>
</table>
### Application

- **Reset all totalizers (2806)**

### Totalizer 1 to n

- **Assign process variable (0914–1 to n)**
- **Unit totalizer (0915–1 to n)**
- **Totalizer operation mode (0908–1 to n)**
- **Control Totalizer 1 to n (0912–1 to n)**
- **Preset value 1 to n (0913–1 to n)**
- **Failure mode (0901–1 to n)**

### Diagnostics

- **Actual diagnostics (0691)**
- **Previous diagnostics (0690)**
- **Operating time from restart (0653)**
- **Operating time (0652)**

### Diagnostic list

- **Diagnostics 1 (0692)**
- **Timestamp (0683)**
- **Diagnostics 2 (0693)**
- **Timestamp (0684)**
- **Diagnostics 3 (0694)**
- **Timestamp (0685)**
- **Diagnostics 4 (0695)**
- **Timestamp (0686)**
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<th>Modbus RS485 register information</th>
<th>Proline Promag 400 Modbus RS485</th>
</tr>
</thead>
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<td><strong>Event logbook</strong></td>
<td></td>
</tr>
<tr>
<td>Diagnostics 5 (0696)</td>
<td>→ 194</td>
</tr>
<tr>
<td>Timestamp (0687)</td>
<td>→ 194</td>
</tr>
<tr>
<td><strong>Device information</strong></td>
<td></td>
</tr>
<tr>
<td>Device tag (0011)</td>
<td>→ 195</td>
</tr>
<tr>
<td>Serial number (0009)</td>
<td>→ 195</td>
</tr>
<tr>
<td>Firmware version (0010)</td>
<td>→ 195</td>
</tr>
<tr>
<td>Device name (0013)</td>
<td>→ 195</td>
</tr>
<tr>
<td>Order code (0008)</td>
<td>→ 195</td>
</tr>
<tr>
<td>Extended order code 1 (0023)</td>
<td>→ 195</td>
</tr>
<tr>
<td>Extended order code 2 (0021)</td>
<td>→ 195</td>
</tr>
<tr>
<td>Extended order code 3 (0022)</td>
<td>→ 195</td>
</tr>
<tr>
<td>Configuration counter (2751)</td>
<td>→ 195</td>
</tr>
<tr>
<td>ENP version (0012)</td>
<td>→ 195</td>
</tr>
<tr>
<td><strong>Data logging</strong></td>
<td></td>
</tr>
<tr>
<td>Assign channel 1 (0851)</td>
<td>→ 195</td>
</tr>
<tr>
<td>Assign channel 2 (0852)</td>
<td>→ 195</td>
</tr>
<tr>
<td>Assign channel 3 (0853)</td>
<td>→ 195</td>
</tr>
<tr>
<td>Assign channel 4 (0854)</td>
<td>→ 195</td>
</tr>
<tr>
<td>Logging interval (0856)</td>
<td>→ 195</td>
</tr>
<tr>
<td>Clear logging data (0855)</td>
<td>→ 195</td>
</tr>
</tbody>
</table>
6.3 Register information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct access (0106)</td>
<td>3878</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 to 65535</td>
</tr>
<tr>
<td>Locking status (0004)</td>
<td>4918</td>
<td>Integer</td>
<td>Read</td>
<td>256 = Hardware locked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>512 = Temporarily locked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2048 = CT active - defined parameters</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>32768 = CT active - all parameters</td>
</tr>
<tr>
<td>Access status display (0091)</td>
<td>--</td>
<td>Integer</td>
<td>Read</td>
<td>Operator</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maintenance</td>
</tr>
<tr>
<td>Access status tooling (0005)</td>
<td>2178</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Operator</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Maintenance</td>
</tr>
<tr>
<td>Enter access code (0003)</td>
<td>2177</td>
<td>Integer</td>
<td>Read / Write</td>
<td>Max. 16-digit character string comprising numbers, letters and special characters</td>
</tr>
</tbody>
</table>
# 6.3.1 "System" submenu

## "Display" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display language (0104)</td>
<td>3673</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = English</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Deutsch</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Français</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Español</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = Italiano</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 = Nederlands</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 = Svenska</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 = Bahasa Indonesia</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11 = 日本語 (Japanese)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12 = Portuguesa</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13 = Polski</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>14 = русский язык (Russian)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15 = čeština (Czech)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16 = 中文 (Chinese)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>17 = ภาษาไทย (Thai)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18 = Türkçe</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>19 = tiếng Việt (Vietnamese)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20 = 한국어 (Korean)</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>21 = العربية (Arabic)</td>
</tr>
<tr>
<td>Format display (0098)</td>
<td>3625</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = 1 value, max. size</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = 1 bargraph + 1 value</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = 2 values</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = 1 value large + 2 values</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = 4 values</td>
</tr>
<tr>
<td>Value 1 display (0107)</td>
<td>3963</td>
<td>Integer</td>
<td>Read / Write</td>
<td>1 = Volume flow</td>
</tr>
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<td></td>
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<td></td>
<td></td>
<td>2 = Mass flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Corrected volume flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = Corrected conductivity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16 = Totalizer 1</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>17 = Totalizer 2</td>
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<td></td>
<td></td>
<td>18 = Totalizer 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>37 = Flow velocity</td>
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<td></td>
<td></td>
<td></td>
<td>39 = Electronics temperature</td>
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<td></td>
<td>40 = Noise</td>
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<td></td>
<td></td>
<td>41 = Coil current shot time</td>
</tr>
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<td></td>
<td></td>
<td>42 = Reference electrode potential</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>against PE</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>45 = Build-up index</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>51 = Test point 1</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>52 = Test point 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>53 = Test point 3</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>121 = Current output 1</td>
</tr>
<tr>
<td>0% bargraph value 1 (0123)</td>
<td>4136 to 4137</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>100% bargraph value 1 (0125)</td>
<td>4142 to 4143</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Decimal places 1 (0095)</td>
<td>3365</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = x</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = x.x</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = x.xxx</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = x.xxxx</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>4 = x.xxxxx</td>
</tr>
<tr>
<td>Value 2 display (0108)</td>
<td>3964</td>
<td>Integer</td>
<td>Read / Write</td>
<td>For the picklist, see the Value 1 display parameter (→ 17)</td>
</tr>
<tr>
<td>Decimal places 2 (0117)</td>
<td>4049</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = x</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = x.x</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = x.xxx</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = x.xxxx</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = x.xxxxx</td>
</tr>
</tbody>
</table>
### Navigation: Expert → System → Display

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value 3 display (0110)</td>
<td>3966</td>
<td>Integer</td>
<td>Read / Write</td>
<td>For the picklist, see the Value 1 display parameter (→ 17)</td>
</tr>
<tr>
<td>0% bargraph value 3 (0124)</td>
<td>4138 to 4139</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>100% bargraph value 3 (0126)</td>
<td>4140 to 4141</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Decimal places 3 (0118)</td>
<td>4050</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = x  1 = x.x  2 = x.xxx  3 = x.xxx  4 = x.xxxx</td>
</tr>
<tr>
<td>Value 4 display (0109)</td>
<td>3965</td>
<td>Integer</td>
<td>Read / Write</td>
<td>For the picklist, see the Value 1 display parameter (→ 17)</td>
</tr>
<tr>
<td>Decimal places 4 (0119)</td>
<td>4051</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = x  1 = x.x  2 = x.xxx  3 = x.xxx  4 = x.xxxx</td>
</tr>
<tr>
<td>Display interval (0096)</td>
<td>3604 to 3605</td>
<td>Float</td>
<td>Read / Write</td>
<td>1 to 10 s</td>
</tr>
<tr>
<td>Display damping (0094)</td>
<td>3554 to 3555</td>
<td>Float</td>
<td>Read / Write</td>
<td>0.0 to 999.9 s</td>
</tr>
<tr>
<td>Header (0097)</td>
<td>3624</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Device tag  1 = Free text</td>
</tr>
<tr>
<td>Header text (0112)</td>
<td>3968 to 3973</td>
<td>String</td>
<td>Read / Write</td>
<td>Max. 12 characters such as letters, numbers or special characters (e.g. @, %, /)</td>
</tr>
<tr>
<td>Separator (0101)</td>
<td>3671</td>
<td>Integer</td>
<td>Read / Write</td>
<td>• (point)  • (comma)</td>
</tr>
<tr>
<td>Contrast display (0105)</td>
<td>3674 to 3675</td>
<td>Float</td>
<td>Read / Write</td>
<td>20 to 80 %</td>
</tr>
<tr>
<td>Backlight (0111)</td>
<td>3967</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Disable  1 = Enable</td>
</tr>
<tr>
<td>Access status display (0091)</td>
<td>——</td>
<td>Integer</td>
<td>Read</td>
<td>• Operator  • Maintenance</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

"Diagnostic handling" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm delay (0651)</td>
<td>6808 to 6809</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 60 s</td>
</tr>
</tbody>
</table>

"Diagnostic behavior" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign behavior of diagnostic no. 531 (0741)</td>
<td>2397</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off  1 = Logbook entry only  2 = Warning  3 = Alarm</td>
</tr>
<tr>
<td>Assign behavior of diagnostic no. 832 (0681)</td>
<td>2759</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off  1 = Logbook entry only  2 = Warning  3 = Alarm</td>
</tr>
</tbody>
</table>
### Modbus RS485 register information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
</table>
| Assign behavior of diagnostic no. 833 (0682) | 2762 | Integer | Read / Write | 0 = Off  
1 = Logbook entry only  
2 = Warning  
3 = Alarm |
| Assign behavior of diagnostic no. 862 (0745) | 2097 | Integer | Read / Write | 0 = Off  
1 = Logbook entry only  
2 = Warning  
3 = Alarm |
| Assign behavior of diagnostic no. 937 (0743) | 2396 | Integer | Read / Write | 0 = Off  
1 = Logbook entry only  
2 = Warning  
3 = Alarm |
| Assign behavior of diagnostic no. 302 (0739) | 2312 | Integer | Read / Write | 2 = Warning  
3 = Alarm |

#### "Administration" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
</table>
| Device reset (0000) | 6817 | Integer | Read / Write | 0 = Cancel  
1 = Restart device  
2 = To delivery settings  
25 = Restore S-DAT backup |
| Activate SW option (0029) | 2795 | Integer | Read / Write | Max. 10-digit string consisting of numbers. |
| Software option overview (0015) | 2902 | Integer | Read | 1 = Extended HistoROM  
8 = 4-20mA,2x pulse/freq./switch output  
16 = 4-20mA, switch/certified pulse output  
32 = Electrode cleaning circuit  
128 = Custody transfer  
512 = Build-up index  
16384 = Heartbeat Monitoring  
32768 = Heartbeat Verification |

* Visibility depends on order options or device settings

#### "Define access code" wizard

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define access code</td>
<td>--</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 to 9999</td>
</tr>
<tr>
<td>Confirm access code</td>
<td>--</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 to 9999</td>
</tr>
</tbody>
</table>
### 6.3.2 "Sensor" submenu

"Measured values" submenu

*Process variables* submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
<th>Access Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow (1838)</td>
<td>3874 to 3875</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
<td>41</td>
</tr>
<tr>
<td>Mass flow (1847)</td>
<td>3876 to 3877</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
<td>41</td>
</tr>
<tr>
<td>Conductivity (1850)</td>
<td>2013 to 2014</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
<td>42</td>
</tr>
</tbody>
</table>

"Totalizer" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
<th>Access Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totalizer value 1 to n (0911 to 1 to n)</td>
<td>1: 2610 to 2611 2: 2810 to 2811 3: 3010 to 3011</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
<td>43</td>
</tr>
<tr>
<td>Totalizer overflow 1 to n (0910 to 1 to n)</td>
<td>1: 2612 to 2613 2: 2812 to 2813 3: 3012 to 3013</td>
<td>Float</td>
<td>Read</td>
<td>Integer with sign</td>
<td>44</td>
</tr>
</tbody>
</table>
### "System units" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
<th></th>
</tr>
</thead>
</table>
| Volume flow unit (0553)    | 2103     | Integer   | Read / Write    | 0 = cm³/s  
1 = cm³/min  
2 = cm³/h  
3 = cm³/d  
4 = dm³/s  
5 = dm³/min  
6 = dm³/h  
7 = dm³/d  
8 = m³/s  
9 = m³/min  
10 = m³/h  
11 = m³/d  
12 = ml/s  
13 = ml/min  
14 = ml/h  
15 = ml/d  
16 = l/s  
17 = l/min  
18 = l/h  
19 = l/d  
20 = hl/s  
21 = hl/min  
22 = hl/h  
23 = hl/d  
24 = Ml/s  
25 = Ml/min  
26 = Ml/h  
27 = Ml/d  
28 = af/s  
29 = af/min  
30 = af/h  
31 = af/d  
32 = fl oz/s (us)  
33 = fl oz/min (us)  
34 = fl oz/h (us)  
35 = fl oz/d (us)  
36 = gal/s (us)  
37 = gal/min (us)  
38 = gal/h (us)  
39 = gal/d (us)  
40 = Mgal/s (us)  
41 = Mgal/min (us)  
42 = Mgal/h (us)  
43 = Mgal/d (us)  
44 = bbl/s (us;liq.)  
45 = bbl/min (us;liq.)  
46 = bbl/h (us;liq.)  
47 = bbl/d (us;liq.)  
48 = bbl/s (us;beer)  
49 = bbl/min (us;beer)  
50 = bbl/h (us;beer)  
51 = bbl/d (us;beer)  
52 = bbl/s (us;oil)  
53 = bbl/min (us;oil)  
54 = bbl/h (us;oil)  
55 = bbl/d (us;oil)  
56 = bbl/s (us;tank)  
57 = bbl/min (us;tank)  
58 = bbl/h (us;tank)  
59 = bbl/d (us;tank)  
60 = gal/s (imp) |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
<th>Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume unit (0563)</td>
<td>2104</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = cm³ 1 = dm³ 2 = m³ (*) 3 = ml 4 = l 5 = hl 6 = Ml Mega 8 = af 9 = ft³ 10 = fl oz (us) 11 = gal (us) 12 = Mgal (us) 13 = bbl (us;liq.) 14 = bbl (us;beer) 15 = bbl (us;oil) 16 = bbl (us;tank) 17 = gal (imp) 18 = Mgal (imp) 19 = bbl (imp;beer) 20 = bbl (imp;oil) 22 = kgal (us) 23 = Mft³</td>
<td>50</td>
</tr>
<tr>
<td>Conductivity unit (0582)</td>
<td>2121</td>
<td>Integer</td>
<td>Read / Write</td>
<td>1 = MS/m 2 = kS/m 3 = S/m 4 = S/cm 5 = mS/m 6 = mS/cm 7 = µS/m 8 = µS/cm 9 = µS/mm 10 = nS/cm</td>
<td>50</td>
</tr>
<tr>
<td>Temperature unit (0557)</td>
<td>2109</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = °C (*) 1 = K 2 = °F 3 = °R</td>
<td>51</td>
</tr>
</tbody>
</table>
### Navigation: Expert → Sensor → System units

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
</table>
| Mass flow unit (0554)      | 2101     | Integer   | Read / Write  | 0 = g/s  
1 = g/min  
2 = g/h  
3 = g/d  
4 = kg/s  
5 = kg/min  
6 = kg/h (*1)  
7 = kg/d  
8 = t/s  
9 = t/min  
10 = t/h  
11 = t/d  
12 = oz/s  
13 = oz/min  
14 = oz/h  
15 = oz/d  
16 = lb/s  
17 = lb/min  
18 = lb/h  
19 = lb/d  
20 = STon/s  
21 = STon/min  
22 = STon/h  
23 = STon/d |
| Mass unit (0574)           | 2102     | Integer   | Read / Write  | 50 = g  
51 = kg (*1)  
52 = t  
53 = oz  
54 = lb  
55 = STon |
| Density unit (0555)        | 2107     | Integer   | Read / Write  | 0 = g/cm³  
2 = kg/dm³  
3 = kg/l (*1)  
4 = kg/m³  
5 = SD4°C  
6 = SD15°C  
7 = SD20°C  
8 = SG4°C  
9 = SG15°C  
10 = SG20°C  
11 = lb/ft³  
12 = lb/gal (us)  
13 = lb/bbl (us;lig.)  
14 = lb/bbl (us;beer)  
15 = lb/bbl (us;oil)  
16 = lb/bbl (us;tank)  
17 = lb/gal (imp)  
18 = lb/bbl (imp;beer)  
19 = lb/bbl (imp;oil)  
21 = g/m³ |
| Date/time format (2812)    | 2150     | Integer   | Read / Write  | 0 = dd.mm.yy hh:mm  
1 = mm/dd/yy hh:mm am/pm  
2 = dd.mm.yy hh:mm am/pm  
3 = mm/dd/yy hh:mm |

*User-specific units* submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>User volume text (0567)</td>
<td>--</td>
<td>String</td>
<td>Read / Write</td>
<td></td>
</tr>
<tr>
<td>User volume offset (0569)</td>
<td>--</td>
<td>Float</td>
<td>Read / Write</td>
<td></td>
</tr>
</tbody>
</table>
### User-specific units

#### Parameter | Register | Data type | Access | Selection / User entry / User interface
--- | --- | --- | --- | ---
User volume factor (0568) | --- | Float | Read / Write | 59
User mass text (0560) | --- | String | Read / Write | 59
User mass offset (0562) | --- | Float | Read / Write | 59
User mass factor (0561) | --- | Float | Read / Write | 59

### "Process parameters" submenu

#### Parameter | Register | Data type | Access | Selection / User entry / User interface
--- | --- | --- | --- | ---
Filter options (6710) | 2273 | Integer | Read / Write | 58
Flow damping (6661) | 2274 | Integer | Read / Write | 58
Flow override (1839) | 5503 | Integer | Read / Write | 58
Conductivity damping (1803) | 5508 to 5509 | Float | Read / Write | 59
Conductivity measurement (6514) | 2268 | Integer | Read / Write | 59

### "Low flow cut off" submenu

#### Parameter | Register | Data type | Access | Selection / User entry / User interface
--- | --- | --- | --- | ---
Assign process variable (1837) | 5101 | Integer | Read / Write | 61
On value low flow cutoff (1805) | 5138 to 5139 | Float | Read / Write | 61
Off value low flow cutoff (1804) | 5104 to 5105 | Float | Read / Write | 62
Pressure shock suppression (1806) | 5140 to 5141 | Float | Read / Write | 62

### "Empty pipe detection" submenu

#### Parameter | Register | Data type | Access | Selection / User entry / User interface
--- | --- | --- | --- | ---
Empty pipe detection (1860) | 5106 | Integer | Read / Write | 64
Switch point empty pipe detection (6562) | 2890 to 2891 | Float | Read / Write | 64
Response time empty pipe detection (1859) | 5108 to 5109 | Float | Read / Write | 64
Empty pipe adjust value (6527) | 2181 to 2182 | Float | Read | Positive floating-point number | 65
Full pipe adjust value (6548) | 2832 to 2833 | Float | Read | Positive floating-point number | 66
Measured value EPD (6559) | 2298 to 2299 | Float | Read | Positive floating-point number | 66
"Empty pipe adjust" wizard

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>New adjustment (6560)</td>
<td>--</td>
<td>Integer</td>
<td>Read / Write</td>
<td></td>
</tr>
<tr>
<td>Progress (6571)</td>
<td>--</td>
<td>Integer</td>
<td>Read</td>
<td></td>
</tr>
</tbody>
</table>

"Electrode cleaning circuit" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrode cleaning circuit (6528)</td>
<td>2280</td>
<td>Integer</td>
<td>Read / Write</td>
<td></td>
</tr>
<tr>
<td>ECC duration (6555)</td>
<td>2330 to 2331</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 = Off 1 = On</td>
</tr>
<tr>
<td>ECC recovery time (6556)</td>
<td>2332 to 2333</td>
<td>Float</td>
<td>Read / Write</td>
<td>1 to 600 s</td>
</tr>
<tr>
<td>ECC cleaning cycle (6557)</td>
<td>2328 to 2329</td>
<td>Float</td>
<td>Read / Write</td>
<td>0.5 to 168 h</td>
</tr>
<tr>
<td>ECC polarity (6631)</td>
<td>2334</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Positive 1 = Negative</td>
</tr>
</tbody>
</table>

"External compensation" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density source (6615)</td>
<td>2497</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Fixed density 1 = External density</td>
</tr>
<tr>
<td>External density (6630)</td>
<td>2117 to 2118</td>
<td>Float</td>
<td>Read</td>
<td>Positive floating-point number</td>
</tr>
<tr>
<td>Fixed density (6623)</td>
<td>2830 to 2831</td>
<td>Float</td>
<td>Read / Write</td>
<td>Positive floating-point number</td>
</tr>
</tbody>
</table>

"Sensor adjustment" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation direction (1809)</td>
<td>5501</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Forward flow 1 = Reverse flow</td>
</tr>
<tr>
<td>Integration time (6533)</td>
<td>2260 to 2261</td>
<td>Float</td>
<td>Read</td>
<td>1 to 65 ms</td>
</tr>
<tr>
<td>Measuring period (6536)</td>
<td>2852 to 2853</td>
<td>Float</td>
<td>Read</td>
<td>2 to 1000 ms</td>
</tr>
</tbody>
</table>

"Process variable adjustment" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow offset (1831)</td>
<td>5521 to 5522</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Volume flow factor (1832)</td>
<td>5519 to 5520</td>
<td>Float</td>
<td>Read / Write</td>
<td>Positive floating-point number</td>
</tr>
<tr>
<td>Mass flow offset (1841)</td>
<td>5525 to 5526</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Mass flow factor (1846)</td>
<td>5523 to 5524</td>
<td>Float</td>
<td>Read / Write</td>
<td>Positive floating-point number</td>
</tr>
<tr>
<td>Conductivity offset (1848)</td>
<td>5529 to 5530</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Conductivity factor (1849)</td>
<td>5527 to 5528</td>
<td>Float</td>
<td>Read / Write</td>
<td>Positive floating-point number</td>
</tr>
</tbody>
</table>
"Calibration" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
<th>→</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal diameter (2807)</td>
<td>2048 to 2057</td>
<td>String</td>
<td>Read</td>
<td>DNxx / x’</td>
<td>80</td>
</tr>
<tr>
<td>Calibration factor (6522)</td>
<td>2313 to 2314</td>
<td>Float</td>
<td>Read</td>
<td>Positive floating-point number</td>
<td>81</td>
</tr>
<tr>
<td>Zero point (6546)</td>
<td>2870 to 2871</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
<td>81</td>
</tr>
<tr>
<td>Conductivity calibration factor</td>
<td>19806 to 19807</td>
<td>Float</td>
<td>Read</td>
<td>0.01 to 10000</td>
<td>81</td>
</tr>
</tbody>
</table>

6.3.3 "Communication" submenu

"Modbus configuration" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
<th>→</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus address (7112)</td>
<td>4910</td>
<td>Integer</td>
<td>Read / Write</td>
<td>1 to 247</td>
<td>113</td>
</tr>
<tr>
<td>Baudrate (7111)</td>
<td>4912</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = 1200 BAUD 1 = 2400 BAUD 2 = 4800 BAUD 3 = 9600 BAUD 4 = 19200 BAUD 5 = 38400 BAUD 6 = 57600 BAUD 7 = 115200 BAUD</td>
<td>113</td>
</tr>
<tr>
<td>Data transfer mode (7115)</td>
<td>4913</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = RTU 1 = ASCII</td>
<td>114</td>
</tr>
<tr>
<td>Parity (7122)</td>
<td>4914</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Even 1 = Odd 2 = None / 2 stop bits 3 = None / 1 stop bit</td>
<td>114</td>
</tr>
<tr>
<td>Byte order (7113)</td>
<td>4915</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = 0-1-2-3 1 = 3-2-1-0 2 = 2-3-0-1 3 = 1-0-3-2</td>
<td>115</td>
</tr>
<tr>
<td>Telegram delay (7146)</td>
<td>4916 to 4917</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 100 ms</td>
<td>116</td>
</tr>
<tr>
<td>Failure mode (7116)</td>
<td>4920</td>
<td>Integer</td>
<td>Read / Write</td>
<td>1 = Last valid value 255 = NaN value</td>
<td>116</td>
</tr>
</tbody>
</table>

"Modbus information" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
<th>→</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device ID (7153)</td>
<td>2547</td>
<td>Integer</td>
<td>Read</td>
<td>4-digit hexadecimal number</td>
<td>118</td>
</tr>
<tr>
<td>Device revision (7154)</td>
<td>4481</td>
<td>Integer</td>
<td>Read</td>
<td>4-digit hexadecimal number</td>
<td>118</td>
</tr>
</tbody>
</table>
### Modbus data map submenu

**Navigation:** Expert → Communication → Modbus data map

<table>
<thead>
<tr>
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<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scan list register 0 to 15 (7114)</td>
<td></td>
<td>Integer</td>
<td>Read / Write</td>
<td>1 to 65535</td>
</tr>
<tr>
<td>0: 5001</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1: 5002</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2: 5003</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3: 5004</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4: 5005</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5: 5006</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6: 5007</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7: 5008</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8: 5009</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9: 5010</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>10: 5011</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>11: 5012</td>
<td></td>
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<tr>
<td>12: 5013</td>
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</tr>
<tr>
<td>13: 5014</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>14: 5015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15: 5016</td>
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</table>

### Web server submenu

**Navigation:** Expert → Communication → Web server

<table>
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<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web server language (7221)</td>
<td>4219</td>
<td>Integer</td>
<td>Read / Write</td>
<td></td>
</tr>
<tr>
<td>0 = English</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 = Deutsch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 = Français</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 = Español</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 = Italian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 = Nederlands</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 = Svenska</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 = Bahasa Indonesia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 = 日本語 (Japanese)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 = Portuguesa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 = Polski</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 = русский язык (Russian)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 = čeština (Czech)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 = ภาษาไทย (Thai)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 = Türkçe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 = tiếng Việt (Vietnamese)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 = 한국어 (Korean)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 = العربية (Arabic)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| MAC address (7214)                | 4210 to 4218 | String     | Read | Unique 12-digit character string comprising letters and numbers |
| IP address (7209)                 | 4155 to 4162 | String     | Read | 4 octet: 0 to 255 (in the particular octet) |
| Subnet mask (7211)                | 4163 to 4170 | String     | Read | 4 octet: 0 to 255 (in the particular octet) |
| Default gateway (7210)            | 4171 to 4178 | String     | Read | 4 octet: 0 to 255 (in the particular octet) |
| Web server functionality (7222)   | 4220       | Integer    | Read / Write | 0 = Off |

* Visibility depends on order options or device settings
### "Application" submenu

**Navigation: Expert → Application**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
</table>
| Reset all totalizers (2806) | 2609 | Integer | Read / Write | 0 = Cancel  
1 = Reset + totalize |

### “Totalizer 1 to n” submenu

**Navigation: Expert → Application → Totalizer 1 to n**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
</table>
| Assign process variable (0914–1 to n) | 1: 2601  
2: 2801  
3: 3001 | Integer | Read / Write | 0 = Off  
1 = Volume flow  
2 = Mass flow  
3 = Corrected volume flow |
| Unit totalizer (0915–1 to n) | 1: 4604  
2: 4605  
3: 4606 | Integer | Read / Write | 0 = cm³  
1 = dm³  
2 = m³  
3 = ml  
4 = l  
5 = hl  
6 = Ml Mega  
7 = af  
8 = ft³  
9 = fl oz (us)  
10 = gal (us)  
11 = gal (mp)  
12 = Mgal (mp)  
13 = bbl (us;liq.)  
14 = bbl (us;beer)  
15 = bbl (us;oil)  
16 = bbl (us;tank)  
17 = gal (imp)  
18 = Mgal (imp)  
19 = bbl (imp;beer)  
20 = bbl (imp;oil)  
21 = kgal (us)  
22 = Mt³  
23 = Mt³*  
24 = g  
25 = kg  
26 = t  
27 = oz  
28 = lb  
29 = STon  
30 = NL  
31 = Nmp³  
32 = Sm³  
33 = Sft³  
34 = Sl  
35 = Sgal (us)  
36 = Sgal (mp)  
37 = Sgal (imp)  
38 = Sgal (oil)  
39 = MMSt³  
40 = MMSt³  
41 = Mgal (us)  
42 = Mgal (mp)  
43 = Mgal (imp)  
44 = Mgal (oil)  
45 = Mgal (liq.)  
46 = Mgal (beer)  
47 = Mgal (beer)  
48 = Mgal (oil)  
49 = Mgal (oil)  
50 = Mgal (beer)  
51 = Mgal (beer)  |
| Totalizer operation mode (0908–1 to n) | 1: 2605  
2: 2805  
3: 3005 | Integer | Read / Write | 0 = Net flow total  
1 = Forward flow total  
2 = Reverse flow total |
| Control Totalizer 1 to n (0912–1 to n) | 1: 2608  
2: 2808  
3: 3008 | Integer | Read / Write | 0 = Totalize  
1 = Reset + totalize  
2 = Preset + hold  
3 = Reset + hold  
4 = Preset + totalize  
5 = Hold |
## Modbus RS485 register information

### Proline Promag 400 Modbus RS485

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preset value 1 to n (0913-1 to n)</td>
<td>1: 2590 to 2591 2: 2592 to 2593 3: 2594 to 2595</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number 133</td>
</tr>
<tr>
<td>Failure mode (0901-1 to n)</td>
<td>1: 2606 2: 2806 3: 3006</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Stop 1 = Actual value 2 = Last valid value 133</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

### 6.3.5 "Diagnostics" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual diagnostics (0691)</td>
<td>2732</td>
<td>Integer</td>
<td>Read</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message. 135</td>
</tr>
<tr>
<td>Previous diagnostics (0690)</td>
<td>2734</td>
<td>Integer</td>
<td>Read</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message. 135</td>
</tr>
<tr>
<td>Operating time from restart (0653)</td>
<td>2624</td>
<td>String</td>
<td>Read</td>
<td>Days (d), hours (h), minutes (m) and seconds (s) 136</td>
</tr>
<tr>
<td>Operating time (0652)</td>
<td>---</td>
<td>String</td>
<td>Read</td>
<td></td>
</tr>
</tbody>
</table>

### "Diagnostic list" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostics 1 (0692)</td>
<td>2736</td>
<td>Integer</td>
<td>Read</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message. 137</td>
</tr>
<tr>
<td>Timestamp (0683)</td>
<td>2710</td>
<td>String</td>
<td>Read</td>
<td>Days (d), hours (h), minutes (m) and seconds (s) 137</td>
</tr>
<tr>
<td>Diagnostics 2 (0693)</td>
<td>2738</td>
<td>Integer</td>
<td>Read</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message. 138</td>
</tr>
<tr>
<td>Timestamp (0684)</td>
<td>2701</td>
<td>String</td>
<td>Read</td>
<td>Days (d), hours (h), minutes (m) and seconds (s) 138</td>
</tr>
<tr>
<td>Diagnostics 3 (0694)</td>
<td>2740</td>
<td>Integer</td>
<td>Read</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message. 139</td>
</tr>
<tr>
<td>Timestamp (0685)</td>
<td>2692</td>
<td>String</td>
<td>Read</td>
<td>Days (d), hours (h), minutes (m) and seconds (s) 139</td>
</tr>
<tr>
<td>Diagnostics 4 (0695)</td>
<td>2742</td>
<td>Integer</td>
<td>Read</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message. 139</td>
</tr>
<tr>
<td>Timestamp (0686)</td>
<td>2683</td>
<td>String</td>
<td>Read</td>
<td>Days (d), hours (h), minutes (m) and seconds (s) 140</td>
</tr>
<tr>
<td>Diagnostics 5 (0696)</td>
<td>2744</td>
<td>Integer</td>
<td>Read</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message. 140</td>
</tr>
<tr>
<td>Timestamp (0687)</td>
<td>2675</td>
<td>String</td>
<td>Read</td>
<td>Days (d), hours (h), minutes (m) and seconds (s) 141</td>
</tr>
</tbody>
</table>
## "Event logbook" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter options (0705)</td>
<td>4596</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Failure (F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = Maintenance required (M)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8 = Function check (C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12 = Out of specification (S)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16 = Information (I)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>255 = All</td>
</tr>
</tbody>
</table>

## "Event list" submenu

## "Device information" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device tag (0011)</td>
<td>2026 to 2041</td>
<td>String</td>
<td>Read</td>
<td>Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /)</td>
</tr>
<tr>
<td>Serial number (0009)</td>
<td>7003 to 7008</td>
<td>String</td>
<td>Read</td>
<td>Max. 11-digit character string comprising letters and numbers.</td>
</tr>
<tr>
<td>Firmware version (0010)</td>
<td>7277 to 7280</td>
<td>String</td>
<td>Read</td>
<td>Character string in the format xx.yy.zz</td>
</tr>
<tr>
<td>Device name (0013)</td>
<td>7263 to 7270</td>
<td>String</td>
<td>Read</td>
<td>Max. 32 characters such as letters or numbers.</td>
</tr>
<tr>
<td>Order code (0008)</td>
<td>2058 to 2067</td>
<td>String</td>
<td>Read</td>
<td>Character string composed of letters, numbers and certain punctuation marks (e.g. /).</td>
</tr>
<tr>
<td>Extended order code 1 (0023)</td>
<td>2212 to 2221</td>
<td>String</td>
<td>Read</td>
<td>Character string</td>
</tr>
<tr>
<td>Extended order code 2 (0021)</td>
<td>2222 to 2231</td>
<td>String</td>
<td>Read</td>
<td>Character string</td>
</tr>
<tr>
<td>Extended order code 3 (0022)</td>
<td>2232 to 2241</td>
<td>String</td>
<td>Read</td>
<td>Character string</td>
</tr>
<tr>
<td>Configuration counter (2751)</td>
<td>4818</td>
<td>Integer</td>
<td>Read</td>
<td>0 to 65535</td>
</tr>
<tr>
<td>ENP version (0012)</td>
<td>4003 to 4010</td>
<td>String</td>
<td>Read</td>
<td>Character string</td>
</tr>
</tbody>
</table>

## "Data logging" submenu

<table>
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<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign channel 1 (0851)</td>
<td>---</td>
<td>Integer</td>
<td>Read / Write</td>
<td></td>
</tr>
<tr>
<td>Assign channel 2 (0852)</td>
<td>---</td>
<td>Integer</td>
<td>Read / Write</td>
<td></td>
</tr>
<tr>
<td>Assign channel 3 (0853)</td>
<td>---</td>
<td>Integer</td>
<td>Read / Write</td>
<td></td>
</tr>
<tr>
<td>Assign channel 4 (0854)</td>
<td>---</td>
<td>Integer</td>
<td>Read / Write</td>
<td></td>
</tr>
<tr>
<td>Logging interval (0856)</td>
<td>---</td>
<td>Float</td>
<td>Read / Write</td>
<td></td>
</tr>
<tr>
<td>Clear logging data (0855)</td>
<td>---</td>
<td>Integer</td>
<td>Read / Write</td>
<td></td>
</tr>
</tbody>
</table>

## "Min/max values" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset min/max values (6541)</td>
<td>---</td>
<td>Integer</td>
<td>Read / Write</td>
<td></td>
</tr>
</tbody>
</table>
### "Main electronics temperature" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum value (6547)</td>
<td>2292 to 2293</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Maximum value (6545)</td>
<td>2294 to 2295</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
</tr>
</tbody>
</table>

### "Simulation" submenu

<table>
<thead>
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1 = Volume flow  
2 = Mass flow  
2 = Conductivity*  
3 = Corrected volume flow  
5 = Corrected conductivity*  
7 = Temperature*  
37 = Flow velocity |
| Process variable value (1811) | 6814 to 6815 | Float     | Read / Write | Depends on the process variable selected |
| Device alarm simulation (0654) | 6812         | Integer   | Read / Write | 0 = Off  
1 = On |
| Diagnostic event category (0738) | 4261         | Integer   | Read / Write | 0 = Sensor  
1 = Electronics  
2 = Configuration  
3 = Process |
| Diagnostic event simulation (0737) | 4259         | Integer   | Read / Write | • Off  
• Diagnostic event picklist (depends on the category selected) |

* Visibility depends on order options or device settings
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